MEMORIAL HOSPITAL NUMBER

# DELAWARE STATE MEDICAL JOURNAL

*Official Organ of the Medical Society of Delaware*
INCORPORATED 1789

VOLUME 24
NUMBER 10

OCTOBER, 1952

Per Year, $4.00
Per Copy 50c

## CONTENTS

THE COMMUNITY AND THE DOCTOR, *Erwin L. Stambaugh, M. D.*, Lewes, Del. ..... 263
CHEMICALS AND HEALTH, *John H. Foulger, M. D.*, Wilmington, Del. ..... 265
INDUSTRY'S CHALLENGE TO MEDICINE, *R. Ralph Bresler, M. D.*, Philadelphia, Pa. ..... 273
RETROLENTAL FIBROPLASIA, *P. Robb McDonald, M. D.*, Philadelphia, Pa. ..... 279
THE TREATMENT OF CANCER OF THE CERVIX UTERI, *John F. Hynes, M. D.*, Wilmington, Del. ..... 286
CONTROL OF EDEMA WITH ELECTROLYTE THERAPY IN TWO CASES OF NEPHROSIS, *Richard A. Neubauer, M. D.*, Wilmington, Del. ..... 291
MEDICAL SOCIETY OF DELAWARE BY-LAWS 294
DELAWARE ACADEMY OF MEDICINE ..... 295
DELAWARE ACADEMY OF GENERAL PRACTICE 295
EDITORIALS ..... 295
BOOK REVIEWS ..... 297
OBITUARY ..... 297

Entered as second-class matter June 28, 1929, at the Post Office at Wilmington, Delaware, under the Act of March 3, 1879. Editorial Office, 822 North American Building, Wilmington 7, Delaware. Business Office, Farnhurst, Delaware. Issued monthly. Copyright, 1952, by the Medical Society of Delaware.

*Diabetes*
*Detection Week*
*November 16-22, 1952*

On November 16, the fifth annual campaign to discover unrecognized diabetes will be launched. The slogan selected for the 1952 drive is: Check Diabetes—Be Tested.

Publicity, urine testing, educational lectures, and the like will bring to light unsuspected latent and active cases of diabetes. Delinquent patients will be encouraged again to co-operate. Diabetics and the public alike will learn more about diabetes detection and control. The American Diabetes Association and co-operating physicians can be justifiably proud of this constructive contribution to the nation's health.

Lilly

ELI LILLY AND COMPANY • INDIANAPOLIS 6, INDIANA, U. S. A.

# toward a fuller life for epileptics

# DILANTIN®

DILANTIN Sodium (diphenylhydantoin sodium, Parke-Davis)
is supplied in Kapseals® of 0.03 Gm. (½ gr.) and
0.1 Gm. (1½ gr.) in bottles of 100 and 1000.

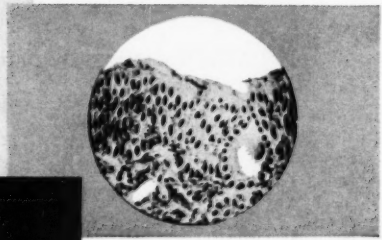
One university has recently graduated sixteen epileptics from its regular courses.[1] Two have received their Doctor of Philosophy degrees, and three have received their Master of Arts degrees. One is now an assistant professor, another has his own business, and all are gainfully employed.

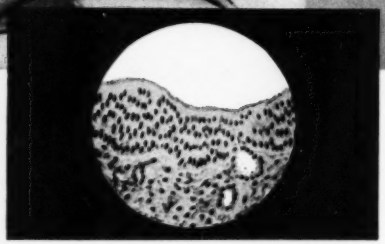
DILANTIN, termed by many authorities a "drug of choice"[2-5] in *grand mal* and psychomotor seizures, is one of the agents chiefly responsible for such admirable results. Maximum success with DILANTIN is obtained with carefully individualized dosage schedules.

1. Michael, N.: Ohio State M. J. *48*:42, 1952.
2. Carter, S., in Conn, H. F.: Current Therapy 1952, Philadelphia, W. B. Saunders Company, p. 610.
3. Lennox, W. G., in Cecil, R. L., and Loeb, R. F.: A Textbook of Medicine, ed. 8, Philadelphia, W. B. Saunders Company, 1951, p. 1379.
4. Lennox, W. G., in Piersol, G. M., and Bortz, E. L.: The Cyclopedia of Medicine, Philadelphia, F. A. Davis Company, 1951, Vol. V, p. 215.
5. Christian, H. A.. The Principles and Practice of Medicine, ed. 16, New York, D. Appleton-Century Company, 1947, p. 1370.

Parke, Davis & Company
DETROIT, MICHIGAN

*prompt and prolonged decongestion in* **COLDS ... SINUSITIS**





Neo-Synephrine hydrochloride, through immediate and prolonged decongestive action, not only restores nasal patency, but also helps to reestablish and protect the physiologic defense mechanisms of the nasal cavity: sinus drainage and aeration.

Neo-Synephrine hydrochloride is notable for its relative freedom from sting and for virtual absence of compensatory congestion. Furthermore, it does not usually produce systemic side effects such as nervous excitation, cardiac reaction or insomnia.

The decongestive action of Neo-Synephrine hydrochloride is undiminished by repeated use—insuring relief throughout the duration of the illness.

¼% solution (plain and aromatic), 1 oz. bottles
½ and 1% solutions (when stronger vasoconstrictive action is needed), 1 oz. bottles
½% water soluble jelly, ⅝ oz. tubes

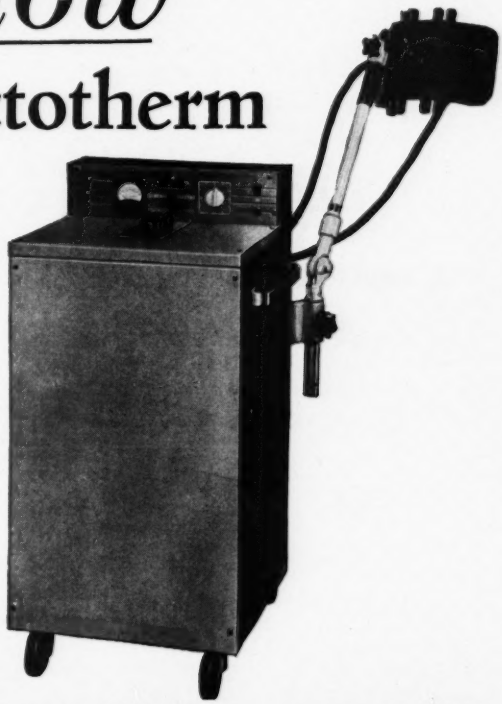
# *Neo-Synephrine*®

**HYDROCHLORIDE**

*Winthrop-Stearns* INC.
NEW YORK 18, N. Y. WINDSOR, ONT.

Neo-Synephrine, trademark reg. U. S. & Canada, brand of phenylephrine

# You'll get a lot more out of the *all-new* GE Inductotherm



Now you can give your patients the desired quality and intensity for the full range of diathermy treatments. New GE Model F Inductotherm combines all the latest advances in induction heating therapy.

As shown in the pictures below, this handsome, trouble-free unit provides for a wide range of diathermy technics. Output has been raised to 200 watts — for most efficient utilization of induction heating methods. Unit is crystal controlled for absolute adherence to FCC-approved frequency.

Demand for the Model F is already great. To insure getting one of these great new Inductotherm units soon, call your GE x-ray representative right away. For illustrated literature, write

GENERAL ELECTRIC

Fully adjustable contour following electrode is part of the basic unit.

Optional is the 12 ft. treatment cable. Note how electrodes attach in rear.

Also available: fully adjustable air-spaced condensor type electrode.

Surgical facilities, integral part of unit, for all medium and light technics.

*Direct Factory Branches:*
**PHILADELPHIA — 1624 Hunting Park Avenue BALTIMORE — 2 West Eager Street**

# *konsyl*

the original unmodified psyllium derivative, contains no deleterious substances. It is all Plantago ovata coating—all bulk. Consequently, *Konsyl* provides maximum bulk action per dose at minimum cost to your patients.

# *konsyl*

## A bulk producing laxative that is <u>all</u> bulk

*compare these advantages*

1. *Konsyl* is composed of the mucilaginous, jell-producing portion of blond psyllium seed. No sugars or other diluents are added and a dose of *Konsyl* supplies bulk and bulk alone.

2. The diabetic, the obese, your routine constipation cases—all can take *Konsyl* safely and without increasing caloric intake.

3. Because *Konsyl* provides a softly-compact, well-formed stool of physiological consistency, it clears the rectum completely and easily, reducing soiling to a minimum. Lesions, when present, are left free of debris, and granulation tissue can form unhampered by foreign materials or an oily film.

4. *Konsyl*, because of its characteristic stool, promotes physiological peristalsis, acts to re-establish the normal defecation reflex.

5. *Konsyl* does not interfere with absorption of fat-soluble vitamins A, D, E, and K. Prothrombin levels are not affected and metabolism of calcium and phosphorus remain unimpaired.

6. *Konsyl* does not leak or complicate the hygiene of the anorectal region. It does not cause indigestion or interfere with digestion. *Konsyl* is non-irritating and is not habit-forming.

*We encourage you to write for samples for clinical comparison*

Supplied: 6 and 12 oz. cans.
Formula: 100% *Konsyl* brand coating of blond psyllium seed.

**Burton, Parsons & Company**
*Washington 9, D. C.*

# Cer-O-Cillin

Upjohn

PROVED in three years' clinical use

Cortone®

ACETATE

(CORTISONE ACETATE, MERCK)

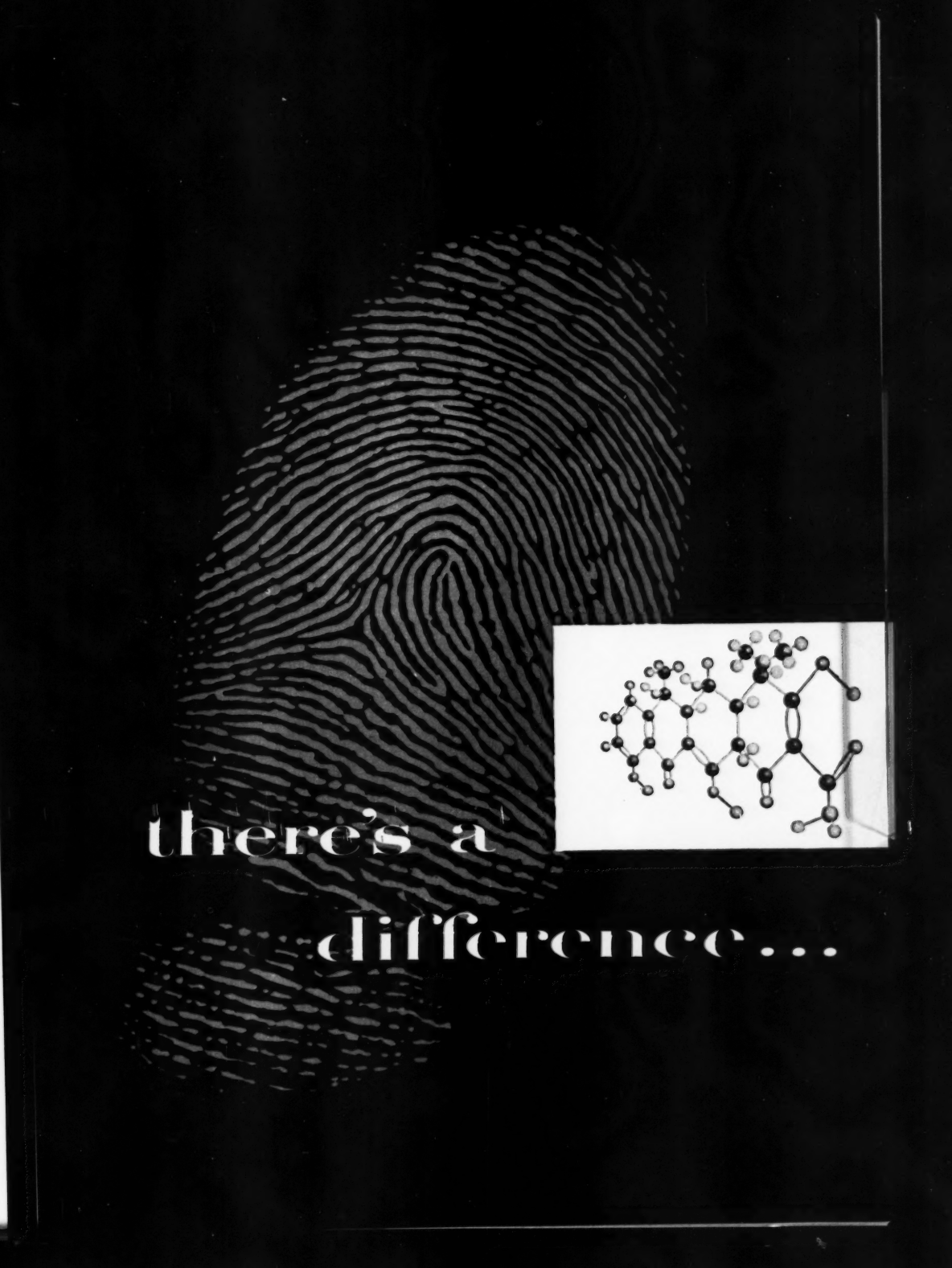
**Typical experience:**

Administration of CORTONE,
systemically, reduced rheumatoid arthritis symptoms
in *all* of 100 patients treated.
Daily maintenance doses of 50 mg. or less, orally,
were adequate in 53 per cent of cases.

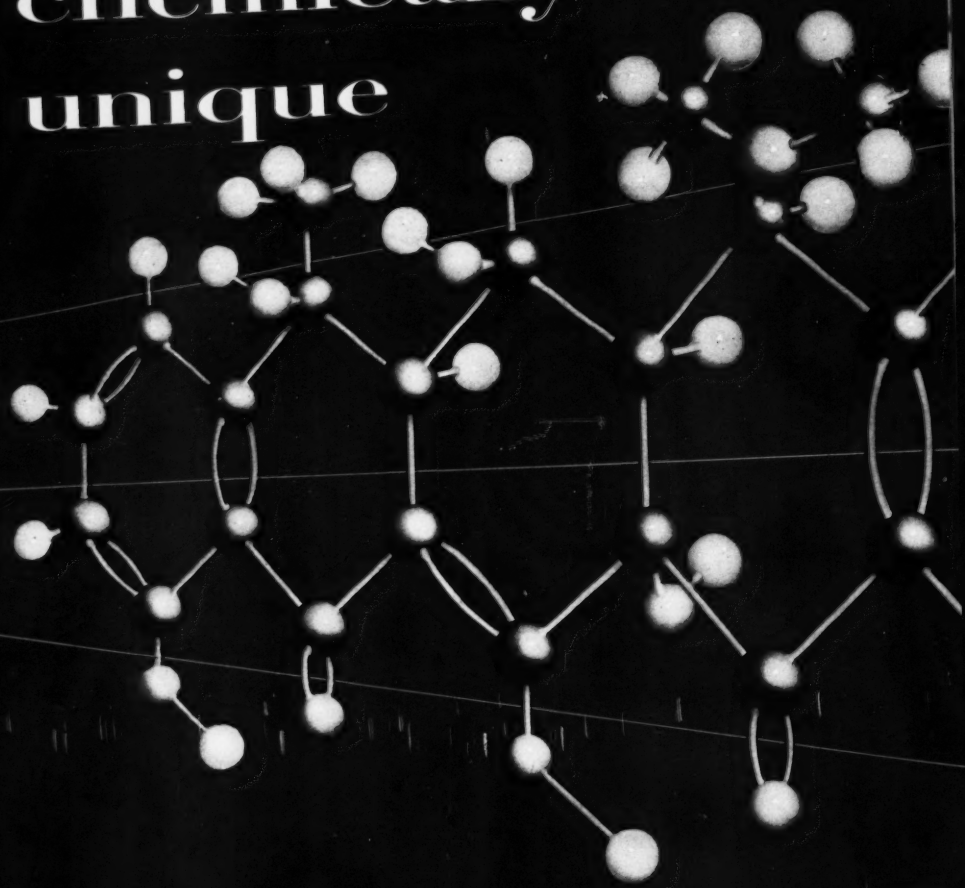
Ward, E., Slocumb, C. H., Polley, H. F., Lowman, E. W., and Hench, P. S.,
*Proc. Staff Meet. Mayo Clin.* **26**: 361, Sept. 26, 1951.

CORTONE is the registered trade-mark of Merck & Co., Inc. for its brand of cortisone.

MERCK & CO., INC.
*Manufacturing Chemists*
RAHWAY, NEW JERSEY
In Canada: MERCK & CO. Limited—Montreal


there's a
difference...

chemically
unique



Pfizer

# clinically unexcelled

# Terramycin

*for* TOLERATION

EFFECTIVENESS

PURITY

POTENCY

ANTIBIOTIC DIVISION, CHAS. PFIZER & CO., INC., BROOKLYN 6, N. Y.

*world's largest producer of antibiotics*

DON'T MISS

APPEARING REGULARLY IN THE J. A. M. A.

*Announcing*

*A new film in full color*

Special Problems in the Management
of
PEPTIC ULCER •
*by*
Department of Gastroenterology
of the Lahey Clinic

A Unit of the Wyeth Peptic Ulcer Service

Among the topics developed are: esophageal ulcer; gastric ulcer, benign and malignant; postbulbar ulcer and subtotal gastrectomy for intractable ulcer in the descending portion of the duodenum; pyloric obstruction; hemorrhage; postoperative jejunal or anastomotic ulcer. 16 mm., color with sound, 30 minutes. To obtain this film for group showing, write to:

FILM LIBRARY
WYETH INCORPORATED
1401 Walnut Street
Philadelphia 2, Pa.

- *FILMS*
- *LITERATURE*
- *MEDICATION*

Wyeth®

WYETH PEPTIC ULCER MEDICATION

Amphojel®, N.N.R. (Aluminum Hydroxide Gel, Alumina Gel)—For the medical management of gastric and duodenal ulcer; or for the control of symptomatic gastric hyperacidity.
Amphojel without Flavor, N.N.R.
Amphojel Tablets N.N.R. (Dried Aluminum Hydroxide Gel, Hydrated Alumina Tablets, 0.3 Gm. (5 grains); 0.6 Gm. (10 grains).
Phosphaljel®, N.N.R. (Aluminum Phosphate Gel)—for marginal ulcer.

"PREMARIN"®

Highly effective • Well tolerated • Imparts a feeling of well-being

"PREMARIN"

The menopausal patient
welcomes the sense of well-being
imparted by "Premarin."

"PREMARIN"

Estrogenic Substances (water-soluble)

"PREMARIN"

also known as Conjugated Estrogens (equine)

"PREMARIN"

6005

AYERST, McKENNA & HARRISON Limited • New York, N. Y. • Montreal, Canada

## Salient facts on the new antituberculous drug...

# NYDRAZID

Squibb Isoniazid

| | *what is known* | *what is not known* |
|---|---|---|
| Antituberculous effect | Nydrazid has greater potency against the tubercle bacillus than any other known compound, both in vitro and in experimental animals. Clinical results are encouraging. The effect on fever and general status is often dramatic. Roentgenographic improvement occurs often, but is generally slower than in patients treated with streptomycin. | It is too early to predict what the long-term effect of Nydrazid will be. Presumably chronic lesions will not respond better than they do to streptomycin, except insofar as Nydrazid penetrates better. Nydrazid and streptomycin appear to have additive effect in vitro, but it is not known how effective such a combination will be in clinical practice. |
| Bacterial resistance | Tubercle bacilli with increased resistance to Nydrazid have been isolated from patients. Resistant organisms can also be cultured in vitro, but this phenomenon is virtually eliminated when cultures are exposed to streptomycin and Nydrazid simultaneously. | The clinical implications of bacterial resistance are not completely known. Patients harboring resistant organisms may continue to improve under treatment. The question of delaying the emergence of resistant bacilli by combined therapy must await further study. |
| Toxicity | Toxic reactions to Nydrazid are chiefly due to stimulation of the central nervous system. They are negligible in the therapeutic dose range, except in patients with convulsive tendencies. | It appears probable that central nervous reactions to Nydrazid can be controlled by barbiturates. But with continued use of the drug, it is not known what sensitivity reactions may occur. |

*Nydrazid is supplied in 50 and 100 mg. scored tablets, bottles of 100 and 1000.*

For further information on Nydrazid send for the Nydrazid Abstract Folder.

**SQUIBB**

"NYDRAZID" IS A TRADEMARK OF E. R. SQUIBB & SONS

E. R. SQUIBB & SONS
745 Fifth Avenue
New York 22, N. Y.

Please send me a copy of the Nydrazid Abstract Folder.

NAME_____

ADDRESS_____

CITY_____ STATE_____

Dept. B

# CORTOGEN
ACETATE

*for*

# CORTISONE

*therapy*

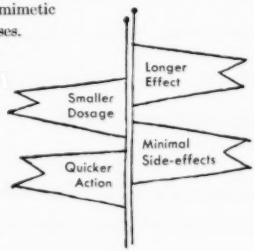
CORTOGEN

The name Schering has come to stand for pioneering research and leadership in steroid hormone chemistry. Now Schering adds this new important product to its steroid line—available in ample amount to meet all your cortisone needs.

***Available as*** 25 mg. tablets, bottles of 30. For complete information write to our Medical Service Department.

Schering CORPORATION · BLOOMFIELD, N. J.

HERE'S a tip: DESOXYN Hydrochloride will make the dieting patient a better bet than before by curbing his appetite and elevating his spirits. More potent than other sympathomimetic amines, DESOXYN produces the desired anorexia with smaller doses. Only one 2.5-mg. or 5-mg. tablet before breakfast and another an hour before lunch are usually sufficient. In recommended doses, DESOXYN has quicker action, longer effect and a low incidence of side-effects. It is also effective as an adjunct in depressive states accompanying menopause, extended illness and convalescence, and in the treatment of alcoholism and narcolepsy. Available at all pharmacies in 2.5-mg. and 5-mg. tablets, elixir and 1-cc. ampoules. Abbott




**Desoxyn®** hydrochloride

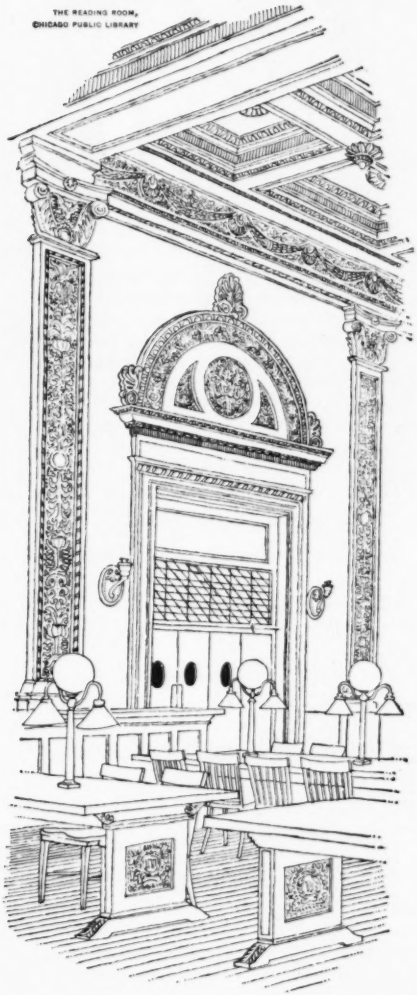
(Methamphetamine Hydrochloride, Abbott)

*New aureomycin minimal dosage for adults—four 250 mg. capsules daily, with milk.*

***From among all antibiotics, Ophthalmologists often choose***

# AUREOMYCIN

*Hydrochloride Crystalline*




***because***

Aureomycin penetrates the ocular tissues and fluids, after passing the blood-aqueous barrier.

Aureomycin in 0.5% solution is well tolerated by the conjunctiva.

Aureomycin may be used locally in appropriate solution; or by mouth; or, in emergency, intravenously; or by a combined approach, depending upon the seriousness of the infection.

Aureomycin has proved of value in a number of ocular infections in which other remedies have failed.

Aureomycin has been reported to be effective against susceptible organisms in the following conditions commonly seen by ophthalmologists:

Blepharitis
Conjunctivitis
Dendritic Keratitis
Epidemic Keratoconjunctivitis
Episcleritis
Periorbital Infection
Acute Trachoma
Uveitis

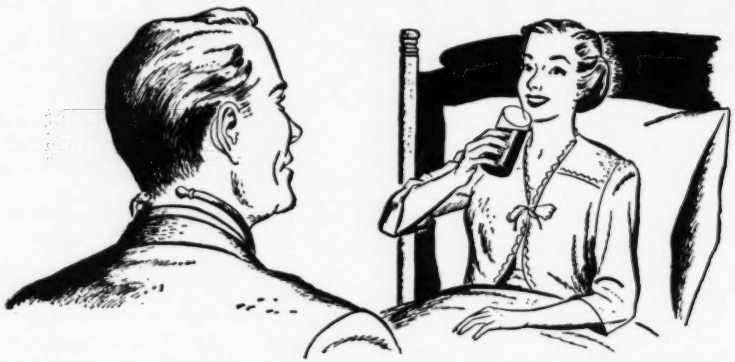
***Throughout the world, as in the United States, aureomycin is recognized as a broad-spectrum antibiotic of established effectiveness.***

*Capsules:* 50 mg.—Bottles of 25 and 100.
250 mg.—Bottles of 16 and 100.
*Ophthalmic:* Vials of 25 mg. with dropper; solution prepared by adding 5 cc. of distilled water.

LEDERLE LABORATORIES DIVISION
AMERICAN Cyanamid COMPANY
30 Rockefeller Plaza, New York 20, New York

## WHEN DRUG THERAPY

# Increases Nutrient Requirements



The administration of many drugs can sharply increase the patient's requirements for various essential nutrients. The presence and action of certain drugs in the organism may alter normal utilization of nutrients to purposes of detoxication of these drugs.

In some instances, drugs may impair absorption of nutrients, increase their destruction within the digestive tract, interfere with their metabolism, or hasten their elimination. With prolonged administration, therefore, unless the intake of various nutrients is increased, deficiency states may be precipitated.

The dietary supplement Ovaltine in milk can significantly increase the nutrient intake of the patient when therapy makes this adjustment necessary. As shown by the table below, it provides substantial amounts of all nutrients known to be essential. Its excellent quality protein furnishes an abundance of all the indispensable amino acids.

Because of its delicious flavor, Ovaltine in milk is universally enjoyed by patients. It is easily digested, bland, and its nutrients are quickly available for utilization. The two varieties of Ovaltine, plain and chocolate flavored, both similar in high nutrient content, allow choice according to flavor preference. Children particularly like Chocolate Flavored Ovaltine.

**THE WANDER COMPANY, 360 N. MICHIGAN AVE., CHICAGO 1, ILL.**

*Ovaltine*

**Three Servings of Ovaltine in Milk Recommended for Daily Use Provide the Following Amounts of Nutrients**

(Each serving made of ½ oz. of Ovaltine and 8 fl. oz. of whole milk)

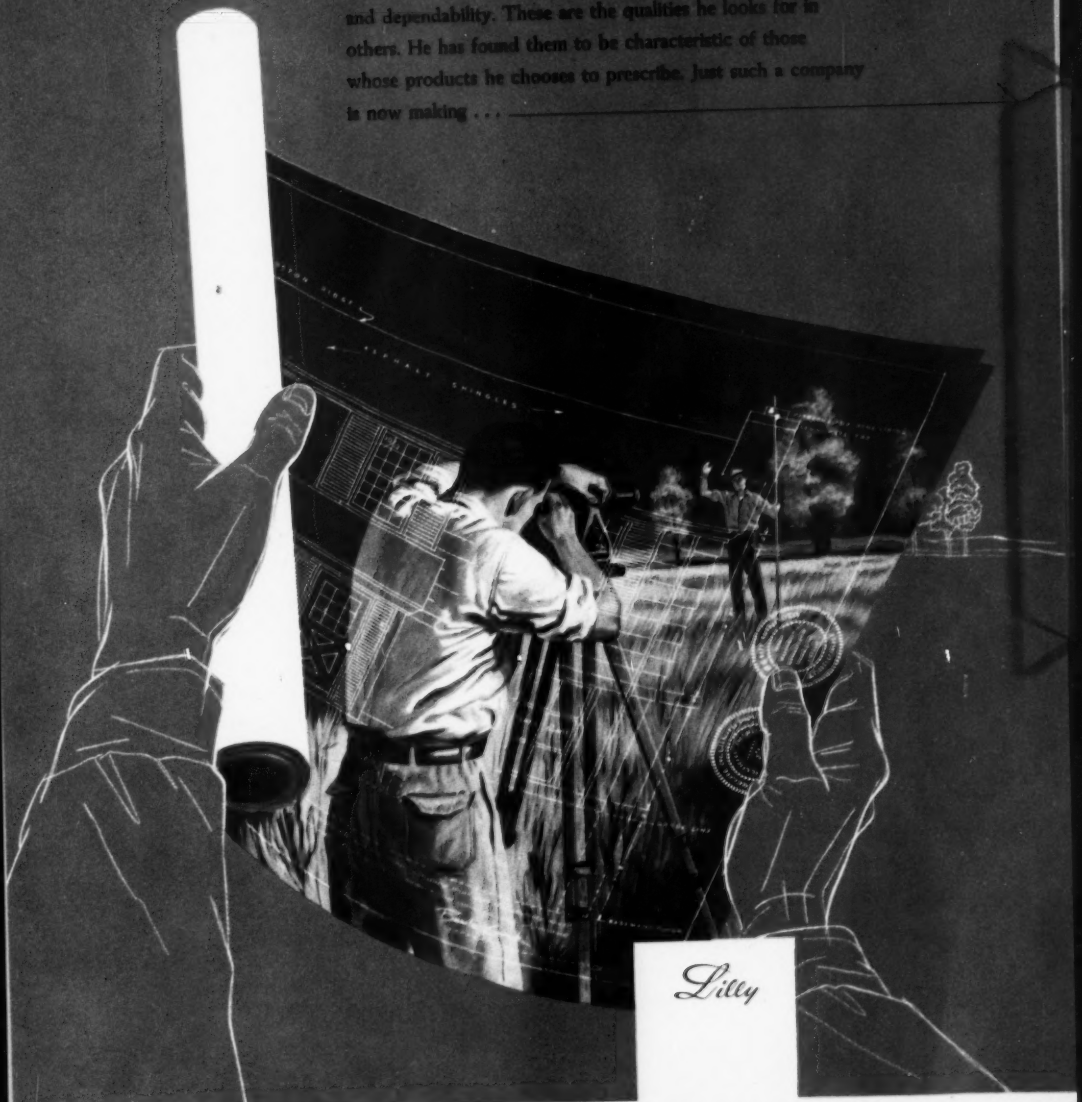
| MINERALS | | | | | | VITAMINS | | | |
|---|---|---|---|---|---|---|---|---|---|
| *CALCIUM | 1.12 Gm. | MAGNESIUM | 120 mg. | *ASCORBIC ACID | 37 mg. | PYRIDOXINE | 0.6 mg. |
| CHLORINE | 900 mg. | MANGANESE | 0.4 mg. | BIOTIN | 0.03 mg. | *RIBOFLAVIN | 2.0 mg. |
| COBALT | 0.006 mg. | *PHOSPHORUS | 940 mg. | CHOLINE | 200 mg. | *THIAMINE | 1.2 mg. |
| *COPPER | 0.7 mg. | POTASSIUM | 1300 mg. | FOLIC ACID | 0.05 mg. | *VITAMIN A | 3200 I.U. |
| FLUORINE | 3.0 mg. | SODIUM | 560 mg. | *NIACIN | 6.7 mg. | VITAMIN $B_{12}$ | 0.005 mg. |
| *IODINE | 0.7 mg. | ZINC | 2.6 mg. | PANTOTHENIC ACID | 3.0 mg. | *VITAMIN D | 420 I.U. |
| *IRON | 12 mg. | | | | | | |

*PROTEIN (biologically complete) ..... 32 Gm.
*CARBOHYDRATE ..... 65 Gm.
*FAT ..... 30 Gm.

*Nutrients for which daily dietary allowances are recommended by the National Research Council.

# Doctor Harris builds a new house

You may be certain that he will insist on a good solid foundation for his new house, consistent with his having built a successful medical practice on sound principles of integrity and dependability. These are the qualities he looks for in others. He has found them to be characteristic of those whose products he chooses to prescribe. Just such a company is now making . . .



Lilly

**. . . the hematinic which comes from antibiotic production**

Since the antianemia effect of liver was discovered twenty-six years ago, true pernicious anemia has ceased to be a necessarily fatal disease; pharmaceutical refinements have made liver therapy increasingly acceptable; knowledge of the constituents of liver and the nature of anemias has increased. These developments have been helped substantially by teamwork between the Lilly Laboratories and other investigators.

It is now known that several chemically dissimilar substances in liver are effective in macrocytic anemias. For example, vitamin $B_{12}$, which is also derived as a by-product of Lilly streptomycin production, is usually effective in pernicious anemia. It is ineffective, however, in certain other macrocytic anemias in which folic acid, another natural constituent of liver, is indicated. From investigations such as are continuing in the Lilly Laboratories, it now appears that there are still other unisolated substances in liver which are potent agents capable of producing blood regeneration. Until all of these are identified and their relationships more clearly defined, the use of liver extract in macrocytic anemias will continue as sound therapy.

*Lilly* ELI LILLY AND COMPANY · INDIANAPOLIS 6, INDIANA, U. S. A.

# DELAWARE STATE MEDICAL JOURNAL

*Issued Monthly Under the Supervision of the Publication Committee*
*Owned and Published by the Medical Society of Delaware*

VOLUME 24
NUMBER 10

OCTOBER, 1952

Per Year, $4.00
Per Copy 50c


## THE COMMUNITY AND THE DOCTOR*


ERWIN L. STAMBAUGH, MD.,
Lewes, Del.


During the past year I have had the honor of being your President. This honor has significance for it came twenty-five years after my graduation from medical school. Accordingly, I pledge a silver-lined address, omitting such phrases as "short-sighted men," "special privilege groups" and "political machines." These and many other themes have been dusted off on television, on the radio and in the press in the past few months. Speaking of the press, it can so easily "overexpose" you or put you "out of focus."

On the subject of blasts and personal attacks, we are reminded of an anecdote. Winston Churchill was strolling through Hyde Park, famed for its soap box orators, who enjoy the privilege of sounding off. Someone was denouncing the royal family. Churchill found a bobby and demanded, "Aren't you going to do something, why don't you arrest that man?" "You see," was the indifferent reply, "it's this way. It won't hurt them and it might help him."

Recently in an article, "What the Community Expects of the Doctor," the editor of the *Cleveland Press* said: "So take the American people into your confidence, tell them and sell them your story. They are eager customers." First, let us tell them that we like working at our profession for the love of the thing. In a questionnaire to medical students, the answers to "Why I want to be a doctor," were somewhat diverse. Some stated that their fathers were doctors. Others answered that they were interested in doing something for mankind. Few had the delusion that it was an easy way to make a living.

Such answers are acceptable to most of us. If we are interested in serving mankind, ours is a natural human interest job. Physicians have a most intimate and continued contact with patients. Since the decline of priest or pastor influence, no other professional man has such a unique opportunity to render good. The doctor is called not only to relieve pain, but he is also a medical priest and confidante in affairs of love or human relations, in matters of family guidance or secrets.

The decision to become a doctor means often the first step towards an education. Shortly, after initiation, there is an urge to aspire to the top of the heap. At one time every soldier in the French army carried in his knapsack a marshal's baton. It is not intended, however, that all should assume leadership. Like in Napoleon's army, we are successful because there are so many of us in a profession, the general level of which is so high.

From time immemorial communities have recognized their responsibility in caring for the sick. A certain Samaritan bound up the wounds of a Jewish stranger and paid for his hospitalization at the inn. Many foundations have been set up to foster the common brotherhood of man. Community chests have extended services to the less fortunate in their problems toward good health. Foundations are the realized dreams of philanthropists. Community chests are the enjoyment of the individual, emulating the Good Samaritan, "Go thou and do likewise."

The same motives inspire the American doctor. One can enumerate example on example of medical care to patients unable to pay. Hippocrates can be blamed or praised for our obligation to the "always with us poor." "Sometimes give your services for nothing, calling to mind a previous benefaction or present satisfaction and if there be an opportunity for serving one who is a

*Presidential Address, delivered before the Medical Society of Delaware, Rehoboth, September 10, 1952.

stranger in financial need, give full assistance to all such. For where there is love of man, there is also love of the art."

The Welfare State, such as England is now, was conceived apparently by those who wanted to practice "noblesse oblige" to the little man, and to the man in the street. This writer holds no brief against constituted authority in England and, therefore, no pronouncement is made of its good or evil. Certainly, those who have much should give something of their plenty, whether it is position, privilege or money. It is for each of us to make up his mind, how much the obligation of the nobility goes beyond the individual and whether governmental practice of the doctrine is desirable. Would socialization of the doctrine surpass the acts of mercy of a modern Samaritan, a conscientious surgeon or a philanthropic realist?

A story is told of Dr. William Mayo. He was called in consultation one afternoon in the case of a high school boy. When he decided the boy needed an operation, the boy exclaimed, "But I haven't any money for an operation." Dr. Mayo looked at him, "Do you think you can earn some after you get well?" The boy thought he could. "All right you see if you can send me ten dollars a month until you've paid one hundred dollars. Two five-dollar bills came to Dr. Mayo's desk regularly. When the tenth pair of five-dollar bills arrived, Dr. Mayo sent the boy a check for a hundred dollars plus generous interest, with a note "You've shown yourself and me, you could do it." I might interject that doctors can well afford to let the patient alone who does something regularly about his unpaid account. Jogging memories occasionally is allowable. I visited Rochester, Minnesota, in the depression years. Talking over hard times with the bus driver, he informed me that the Mayos never brought a lawsuit against a patient for medical services. The man in the street knew this. Several years later, Helen Clapsattle in her book, "The Doctors' Mayo," recorded the point in print.

In analyzing our worth to the community it is genuinely felt that patient-physician relationship is improving. We have come a long way from the wrecker who walks the town content with the labors of tearing down the confidence that the majority of patients have in their doctor. On the other hand, physicians have come a long way from the laissez-faire policy of public relations of several years ago. Dr. John Cline, in his address, June 1952, to the A.M.A. House of Delegates put new life in our ethics. He states "our code of ethics is not a body of law but is a pattern for conduct. In a sense, it is the code of gentlemen in the practice of medicine. Even if it did not exist, it would not be violated by many because the vast majority of our members are gentlemen." He further adds "Unfortunately, there are a few of our colleagues who do not respect these obligations. When they are encountered they must be thrust from the company of gentleman." I personally believe that the large fee money chargers, doctors who want to be excused from night pains and those who want their fee ready will soon be retreating to a forced retirement.

The aims of the profession as regards ethical practice of its members are clear cut. Dr. Louis Bauer in his Public Relations Conference in December 1951 cautions thus: "that physicians must be brought to the realization that medical progress will cease unless physicians work together." One of the best ways to work together is in the meetings of the several medical societies. I have nothing but praise for the members of the Sussex County Society who are holding together a small but strong unit. I likewise hold respect for the members of the Medical Society of Delaware, who almost to a man sit as the House of Delegates year after year. They are the "Old Guard" expressing loyalty without political intent.

About a physician's loyalty, Hippocrates swears "To hold my teacher in this art equal to my own parents, to make him partner in my livelihood, to teach them this art, if they want to learn it, without fee or indenture." Congress was looking for a Code of Ethics not too long ago. It was early accepted in their code that loyalty to God and country were above loyalty to party or organization. In solemn affirmation, American doctors subscribe to this higher, straight-shooting loyalty.

From everywhere we hear that physicians

should interest themselves in all types of political issue. "Mr. Politics," the patient, wants a shot in the arm from the doctor. It is true that physicians can help the American way of life, and if you can be a good politician and a good doctor, get in the swim. A physician son of the late Senator Zellers of Mississippi warns me—don't plunge into local politics, it's safe on a state or national level.

This writer is convinced that medical men have isolated themselves from community life. I judge myself severely on this point. A poignant reason for failing to assume leadership in community affairs is our poor training but we cannot be too apologetic, when church, school, hospital or lodge call for our talents. These organizations can stimulate our thinking and improve our moral intellect in godliness and good government. Our affiliations should not direct our thinking, however, to labor, agriculture, business or even medical consultations. Far too many join up because it is good business and like birds of the air flock to the proverbial mustard tree. Sooner or later, these men show up somewhere, seeking power with contract.

If I may, let me refer to the plutocrats in medicine. Here is power with sanction. They play up the distorted idea that the doctor business is crowded. They set standards higher and higher but fail to make room at the top for the large number of excellently trained men asking for the too few residencies. Many such young men become frustrated before they complete their studies—the wolf knocking at their door. John G. Clark, a Philadelphia surgeon in the early 1900's, trained three full-fledged professors. Such unselfish teaching of surgery could be duplicated in large and small community hospitals. Unfortunately, too many surgeons like to speak of how many assistants they have rather than how many surgeons they are training. We are our brother's keeper and teacher, whether our hospitals are on a university or a community level.

A step forward has been taken by the American Medical Association and the American Medical Education Fund will be worthy of the name if it makes money available for teaching medical men in smaller communities as well as medical students. For, it is singular that not one of the top-flight men on the program this week stressed the importance of a large audience. With such talent abroad in our small communities, I have hope that the government will some day bow to our claim that American medicine, a private enterprise, is the best in the world.

After a few months I bow out as President of the Medical Society of Delaware. I have gained much and contributed little. There is a thought that I would like to convey to you, contained in a Greek inscription near a hearth in Pyne Tower, Princeton University. The inscription was taken from an early Christian tombstone in Syria. Its translation reads: "I sojourned well, I journeyed well, and well I lie at rest. Pray for me." May it be said of every medical doctor in every community in Delaware that he has done just that.

## CHEMICALS AND HEALTH*

JOHN H. FOULGER, M. D.,**
Wilmington, Del.

Every advance in science or technology applied widely in daily life in transportation, communication, manufacture, therapeutics or any other field brings with it new responsibilities. Not the least of these is the assuring that new benefits conferred are not offset by new and difficult problems in public health. Experience has shown that when new discoveries are used with care and intelligence health problems are kept at a minimum and benefits are multiplied; but it also shows that when they are used with carelessness, stupidity or lack of consideration for others, as in the case of the automobile, there may be an accumulating and disgraceful record of deaths and injuries.

At the moment we live in a "chemical age." Chemical industry throughout the world and especially in the United States has made from the alchemists' four elements, "earth, air, fire and water," new materials which alone or in combination with products of other skills bring us improved transportation and communication; improved housing and more colorful and useful equipment for it; new cloth-

*Read before the Medical Society of Delaware, Wilmington, October 10, 1951.

**Director of Medical Research, E. I. du Pont de Nemours & Company.

ing materials; better medicaments; and, last but not least important, more abundant harvests of better, cleaner and more nutritive food and the means of protecting that food against pests of all types, against dust in the air of our cities, and against bacterial contamination. Yet there are those who have become fearful lest, at the same time, the "Chemical Age" is bringing us important health problems.

The chemical industry was a comparative infant in 1914 at the beginning of the First World War. It rapidly attained adolescence during the latter years of that war in supplying a multitude of necessities for our allies and ourselves, including munitions of war. When released from the necessity of diverting much of its attention to military needs, the industry soon attained manhood and is still growing rapidly. It is far more prolific in producing valuable materials of peace than it ever was in making those of war.

It is unfortunate that a knowledge of, and particularly a vision of, the benefits which could be conferred by industrial chemistry did not exist during the period of 1914-1918. During that period, the general public was suddenly and unexpectedly introduced to certain properties of new chemicals which could give great concern. In May, 1916, the German Army attacked French and Canadian lines in France with chlorine gas. By introducing chemical warfare, the enemy gained a tremendous military advantage, the outcome of which we could not foresee, and propagandists gained material for great activity. Echoes of the propaganda campaign are still with us. Only about a week ago, radio news commenators laughed at the disclosure that one of the so-called "violations" of the neutrality of Kaesong was the entry into that city of a delousing squad of South Korean soldiers armed with lethal weapons—DDT spray guns. Yet this claim is no more absurd than statements in medical literature which identify DDT with virus X or which ascribe poliomyelitis to chronic cyanide poisoning.

We are concerned here with the medical record of the effects of chemical warfare in World War I because it gives us a background against which to compare peacetime hazards. The records show what may happen when deliberate attempts are made to injure human beings by mass exposure to high concentrations of chemicals, irritating principally the respiratory system. The medical record is not well known, especially to the general public. It is as follows: Gas casualties in all the armies engaged (allied or enemy) represented only 4.6 per cent of all casualties produced by the weapons and hazards of war. The total deaths from gas represented only 1.3 per cent of all deaths. Among the casualties due to weapons and hazards other than gas, the death rate was 25.5 per cent. Among gas casualties, the death rate was 7.6 per cent. In the American Expeditionary Force in France, gas casualties represented 31.5 per cent of all casualties. Only 1.8 per cent of those injured by gas died. Of those injured by weapons and war hazards other than gas, 6.5 per cent died.

The record of chronic injury is no less favorable. In 1920, the British Ministry of Pensions recorded that gas warfare was responsible for only 2 per cent of all pensionable disabilities among British troops. Thirty-five per cent were caused by weapons other than gas and 63 per cent by disease. In considering types of disease which cause most public alarm, American Expeditionary Force records show that only 4 per cent of all cases of blindness were due to gas despite the fact that gas was responsible for 33 per cent of the non-fatal casualties. Tuberculosis occured in 2.45 men per thousand of those injured by gas, whereas the annual rate for all enlisted men serving in the American Expeditionary Force in France was 3.5 per thousand in 1918 and 3.4 per thousand in 1919. It would seem that the tremendous horror of chemicals built up during the First World War is, from the medical point of view, unjustified, and persistent fears of the action of chemicals derived from First World War propaganda are not based upon fact.

In recent months, two situations have aroused in some quarters the fear of public injury by the increasing use of new chemical products—the Donora "smog" disaster and popular magazine articles concerning chemicals in foods.

During the last week of October, 1948, the

town of Donora, Pennsylvania, was enveloped by "smog". From the morning of Wednesday, October 27, to the afternoon of Sunday, October 31, the little valley in which Donora is situated became virtually an enclosed chamber into which poured all gaseous and particulate matter produced by domestic and industrial activities. As concentrations of irritant material in the air built up, sickness increased; and, before rain cleared the "smog" on Sunday afternoon, twenty persons were dead and several thousand more had become ill. The situation was investigated after the "smog" had cleared by the United States Public Health Service and other agencies. First it was believed to be due to chemicals of industrial origin, but actually no single chemical was found in sufficient concentration to be, alone, a cause of respiratory distress or to affect the cardiovascular system. In those affected by the "smog," both incidence and severity increased with increased age. Among those who were fatally ill, previously existing diseases of the cardiorespiratory system appeared as a significant factor. In general, the "smog" appeared to produce a degree of irritation of the respiratory tract and other exposed mucous membranes varying from mild to severe. Pathological study of three of those who died showed acute change in the lungs characterized by capillary dilation, hemorrhage, edema, purulent bronchitis and bronchiolitis.

The Donora incident caused great alarm and the President called a United States Technical Conference on Air Pollution in Washington on May 3, 4, and 5, 1950. We attended this conference as a member of the Health Panel. The Conference disclosed that the Donora incident was due to unique atmospheric conditions. Apparently in the Donora valley during the period of the "smog" the temperature of the air near the ground was below that at higher altitudes. In the absence of wind, the usual convection currents did not exist and smoke and gases emitted from households burning soft coal and from industrial plants could not be diluted or moved out of the valley. The Conference disclosed no new information on the relationship between atmospheric contamination and disease. It was agreed that "pollution of the atmosphere with allergenic material of natural, artificial or industrial origin is associated with a frequent, and apparently increasing, occurrence of acute and chronic disease, involving especially the respiratory tract and the skin." But it was also agreed that "the effects of the more common atmospheric pollutants upon the general health of the population of our urban and industrial centers have not been demonstrated in the form of authenticated chronic disease processes." During discussion by the Health Panel, it was pointed out that the most important source of information on human beings has been derived from industrial medical and hygienic experience and that the occupational diseases which occur in association with occupational experience have not been shown to occur, except with the greatest rarity, in the general population. To these conclusions we would add that we know of few "allergenic materials" of industrial origin which would be emitted from industrial plants and none which would appear in the general urban atmosphere in adequate concentration to cause allergy. The major causes of allergy are still pollens and other materials of natural origin.

There are very few places in the United States in which the conditions which led to the Donora situation could be reproduced. There are, to my knowledge, none in the State of Delaware; nor are there, to my knowledge, any cities in the State of Delaware in which atmospheric contamination, either from domestic sources or from industrial plants, could reach such a degree that serious acute illness or chronic illness might result.

During the past 18 months, a House Select Committee to Investigate the Use of Chemicals in Food Products has been sitting to take evidence on the possible effects upon the public health of chemicals used in the production, processing and packaging of foods. During the sitting of this Committee a number of sensational articles have appeared in popular magazines, all of them based upon the less scientific testimonies before the House Committee. Whether or not this propaganda has any ulterior motive is not pertinent to this scientific discussion, but the facts

concerning food and the nation's health are pertinent. Since 1906, the Food and Drug Administration of the Federal Government has had wide powers to control the safety of food moving in interstate commerce. In particular, these powers have been wide since an amendment to the original Food and Drug Act was passed by Congress in 1938. As part of its function, this Administration investigates incidents of food poisoning throughout the United States, attempting in so far as possible to allocate the cause. Each year the Commissioner of the Administration makes a report to his superior, originally the Secretary of Agriculture but at the present time the Administrator of the Federal Security Agency. During the years 1938 to 1948, inclusive, 647 incidents of food poisoning were investigated. Of these, chemicals played a part in only 53. The others were due to botulism or more often to bacterial contamination (Table 1). In making this summary, I

**TABLE 1**
FOOD "POISONING" 1938-1948
Summary of Administrative Reports
Federal Food & Drug Administration

| Incidents Involving | | Individuals Affected | | | |
|---|---|---|---|---|---|
| Total | Chemicals | Total | | Chemicals | |
| | | Fatal | Not Fatal | Fatal | Not Fatal |
| 647 | 53 | 160 | 11,091+ | 68 | 953+ |
| | | Including **Sodium Fluoride** accidentally mixed in food. | | | |
| | | Fatal ..... 61 | | | |
| | | Not Fatal .....444+ | | | |
| | | Total .....505+ | | | |

have studied concurrent medical literature in an attempt to find actual medical evidence of the outbreaks reported, particularly when they are claimed to concern chemicals. I have been unable to find in medical literature any incident in which chemicals incorporated into foods during production, processing or packaging for interstate commerce have caused serious injury or death. The record of the Food and Drug Administration only contains one episode of this type, in which monochloracetic acid incorporated in an orange drink is said to have caused gastroenteritis. There is no medical record of this occurrence. Those incidents investigated by the Food and Drug Administration which did involve chemicals were, predominantly, due to accidental introduction of chemicals into food during preparation in the kitchen. Sodium fluoride used as roach poison was the chemical incriminated in most of the fatalities and in more than half of the cases of injury.

It seems a valid deduction from this record that during the period covered serious health hazards have not arisen by the application of modern chemical technology to the production, processing and packaging of food. During this period of time, however, there have been many outbreaks of food poisoning due to decomposition of the food by bacteria or to production within the food of toxic chemicals of bacterial origin. Regarding the causes of food poisoning, the Commissioner of the Food and Drug Administration reported as far back as 1940: "It is further a matter of concern that poisonings from the accidental inclusion of insecticides in food should continue to occur within the home. Regardless of the application of food laws, it is obvious additional precautions must be exercised by those who handle and prepare food if there is to be material reduction in the number of cases of illness attributable to contaminated foods."

Failure to disclose evidence of widespread acute injury due to modern chemical technology in the food field has led some to postulate chronic poisoning as a cause of increasing "nervous and mental diseases" and degenerative diseases. Such an idea is entirely without factual basis. Experience gained from many years' study of industrial chemicals indicates that no new or unexplainable diseases are being produced in the general populace by minute quantities of new chemical products in foods. The increasing care being taken in toxicological testing makes it less and less likely that injury will develop from advances in food technology. There is one group of compounds, however, which may give us some concern. I refer to those biologically active principles which we term "hormones." In our opinion, the general public should not be exposed to such compounds either of natural or synthetic origin, nor to their active derivatives, except under close medical observation. These compounds, however, are drugs and their use can be controlled by the wide powers given the Fed-

eral Food & Drug Administration under the New Drug amendment added to the law in 1938.

There remains one field to discuss—the possible effect of chemicals used in the home. Our summary of Food & Drug Administration reports showed that careless handling of food in the home was the major cause of accidental poisoning through foods. An increasing number of new products of the chemical industry is used in household tasks. Are poisonings frequent?

The National Safety Council each year publishes a booklet entitled "Accident facts." the relative hazards which they may introduce into the home. It will be noted that three groups of materials are important as hazards to both adults and children, namely, medicaments, pesticides and solvents. The group of medicaments includes all types of compounds, whether obtained on prescription or not on prescription, which may be present in the medicine chest or the cupboards of an ordinary household. No one material is prominent, but I would point out that even the supposedly harmless aspirin can have serious effects upon young children. Among the pesticides, three types appear particularly

**TABLE 2**

COMPARATIVE DATA ON CAUSES OF DEATH IN 1947

| | |
|---|---|
| Heart disease | 460,580 |
| Cancer | 189,811 |
| Cerebral hemorrhage | 111,725 |
| Accidents | 99,579 |
| Automobile | 32,697 |
| Home | 34,500 |
| Occupational | 17,000 |
| Others | 11,940 |
| Nephritis | 80,288 |
| Pneumonia | 54,172 |
| Tuberculosis | 48,064 |
| Premature birth | 41,053 |
| Diabetes | 31,515 |
| Congenital malformations | 20,315 |
| Absorption of poisonous gas | 1,938 |
| Motor vehicle exhaust | 285 |
| Utility gas | 1,009 |
| Other sources of carbon monoxide | 354 |
| Other poison gases | 290 |
| Acute poisoning by liquid or solid[a] | 1,504 |

a—More than 25% due to barbituric acid and derivatives

In Table 2 we have summarized data collected from accident facts concerning causes of death during 1947. Accidents in the home numbered 34,500. Automobile accidents totaled 32,700 in round figures. Chemical poisonings, by liquid or solid, numbered 1504, of which more than 25 per cent were due to barbituric acid and derivatives. Reports of accident facts in more recent years show a similar distribution of causes of accidental death.

A more detailed picture of the situation can be shown by data collected from summaries of non-industrial poisoning cases assembled by the Manufacturing Chemists' Association from a national clipping agency. The summary presented in Tables 3 and 4 was collected over the period January, 1944, to December, 1951, but does not necessarily represent all chemical injuries occurring during that period. It does, however, give a picture of the types of material involved and dangerous to children, namely, those materials used as poisons for rats, for ants and for roaches. These are usually barium and thallium compounds and fluorides or fluorosilicates. I am pointing this out because in this case the materials in the home to be used specifically as poisons and are, in the majority of cases, so labeled. Among the solvents, kerosene occupies a predominant place as a source of injury to children. The cases of poisoning of children by drinking kerosene occurred at ages under five years and mostly under two years. Kerosene is not, under ordinary circumstances, harmful. It can cause quite serious skin burns and would be extremely irritant to the gastrointestinal tract if taken by mouth; but to young children it is very dangerous, leading very rapidly after drinking to pronounced irritation of the lungs and bronchopneumonia.

No amount of legislation and, I am afraid, no meticulousness of labeling materials used

around the household will necessarily prevent this form of accident to young children. It is a result of thoughtlessness, carelessness or actual indifference and in this respect is comparable to the situation which obtains with respect to injuries by the automobile. It should be pointed out, however, that the total number of deaths and non-fatal poisonings of this type is small compared with the total produced by the automobile. During the seven years over which the data of which

**TABLE 3**

ACCIDENTAL (NON-INDUSTRIAL)
CHEMICAL POISONING

| | Children and Adolescents (0-18 yrs.) | | Adults | |
|---|---|---|---|---|
| | Total | Fatal | Total | Fatal |
| Acids | 8 | 4 | 16 | 2 |
| Alkalis | 57 | 12 | 6 | 3 |
| Disinfectants | 49 | 1 | 11 | 4 |
| Laundry materials | 58 | 5 | 3 | 0 |
| Medicaments | 216 | 81 | 41 | 14 |
| Pesticides | 260 | 54 | 33 | 18 |
| Solvents | 390 | 63 | 21 | 8 |
| Other chemicals | 130 | 28 | 20 | 6 |

**TABLE 4**

ACCIDENTAL (NON-INDUSTRIAL)
CHEMICAL POISONING
Important Causes of Accidental Injury to Children and Adolescents

| | Total | Fatal | | Total | Fatal |
|---|---|---|---|---|---|
| **Pesticides** | **260** | **54** | **Solvents** | **390** | **63** |
| including | | | including | | |
| Rat Poison | 101 | 34 | Cleaning Fluids | 37 | 8 |
| Ant Poison | 55 | 6 | Kerosene | 247 | 41 |
| Roach Poison | 23 | 5 | Gasoline | 33 | 4 |
| | | | Turpentine | 36 | 5 |
| | 179 | 45 | | | |
| | Total | Fatal | | 353 | 58 |

Tables 3 and 4 were collected, there were, in round figures, about 200,000 deaths in automobile accidents and 8,000,000 cases of non-fatal injuries. Accidents in the home, other than poisonings, caused almost as many deaths as the automobile.

The hazards of chemicals used in the home can be reduced, or indeed completely eliminated, by a few simple precepts: 1. Never store any cleaning fluids or pesticides or medicaments in places easily available to young children or to irresponsible adults. 2. Never transfer any of these materials from the original packages to unlabeled containers. 3. Never place these materials in cupboards or medicine chests close to articles used in preparing food or to medicines. 4. Always read labels and try intelligently to conform to the safety precautions prescribed by those labels.

We planned in this paper to answer the following questions: 1. Is there serious risk of harm from "smog" in our cities? 2. Is there serious risk of harm in the use of chemicals and chemical products in preparation of our food or in household tasks? 3. If risk exists, where does it lie and how can it be prevented? The answers are: 1. Except under unusual atmospheric and meteorologic situations such as those existing in Donora in October, 1948, there is no serious risk of harm from "smog" in cities. 2. The record indicates that the use of chemicals and chemical products in production, processing and packaging of our foodstuffs has not led to serious harm, nor is there reason to expect new and serious injuries as a result of this use of chemicals. 3. Chemicals and chemical products used in the household do offer a hazard, particularly to small children. The hazard is small compared with others present in the home and with the hazard from the automobile. Even this hazard, however, can be reduced or completely eliminated if care and common sense are used in the using of new materials in the home.

*6039 duPont Building.*

DISCUSSION

DR. D. H. AITKEN: (Wilmington) I think we should congratulate Dr. Foulger for the excellent presentation he has given us. The value of chemicals in health is becoming more and more obvious to all of us. I am certainly in no position to discuss the industrial aspect of it, but I would like to say just a few words about the therapeutic use of chemicals and the way it influences our treatment today.

It is of interest to note that in the last analysis they had from the pharmaceutical companies it is estimated that sales have risen from $445 million in 1947 to an estimated one billion dollars of sales in 1950. Of that total over half of the sales have been in the antibiotics, histamines, cortizones and ACTH fields.

It is altogether too early in the use of ACTH and cortizone and some of our antibiotics to say definitely whether it is going to have an influence upon the future health

of our country and also the generations to come.

The other subject I would like just to touch briefly on is hormones. There is no doubt that the use of hormones in our practice today is quite popular. You can't open a magazine or a newspaper today that you don't find large advertisements facing you "Regain lost youth—all you have to do is take one or two hormone tablets and you are well on your way."

It wasn't until two years ago that hormones were sold over the counter without prescriptions by one of the leading drug houses in the country, which just recently has been forbidden to do so.

There is no doubt that there can be great harm in the use of these hormones. The one that will cause probably the most harm is testosterone. That is the one used probably more than any of the hormones. We know testosterone is dangerous because of carcinoma of the prostate. You probably know that some 8-10,000 people die every year with carcinoma of the prostate, and a review of different authorities on this subject reveals that they estimate that 14-16% of all men over the age of fifty have carcinoma of the prostate. That means that many of these are discovered postmortem—they are asymptomatic.

We know testosterol will cause carcinoma of the prostate to grow very rapidly. And with testosterol being used with drunkards, the problem becomes a more serious one.

There is a question I would like to ask Dr. Foulger on this smog incident in Donora. Granted, as I understand it, they were unable to find the cause of why the 20 people died, and the thousands of casualties they had at the time—and, I believe Dr. Foulger said it is very unlikely that this will ever occur again because of the very peculiar atmospheric condition—but, I am wondering if it would not be highly probable that the same thing could happen in the San Francisco Bay area, for example. As I understand it that is very similar to the situation that existed at Donora where a similar condition could quite possibly arise and where there is a much larger amount of space involved and also a greater number of people involved.

Dr. J. W. Howard: (Wilmington) I feel quite honored being asked to discuss such a paper as Dr. Foulger has presented. I consider it a scholarly piece of work and I hope that many of our conferees who found it strenuous getting here this morning will have the opportunity to read this paper. I think that Dr. Foulger presented to us what could be an extremely complex problem in a quite interesting way.

I want to compliment Dr. Foulger. I think that he has given us a number of themes, that as we sat and listened to or will read later, we can develop in our own mind to our own advantage and to the advantage of our community.

Underlying our whole program here I think is a distinct demonstration that we can have a great deal of faith in our reliable chemical organizations. The pharmaceutical houses and chemical manufacturing concerns have assumed the responsibility that we as individuals, I am certain, have failed to practice. We have good legislation to help us. And the record that Dr. Foulger has indicated I think is duplicated in the experiences in the hospitals. We don't see problems that we can trace to our reliable manufacturers. We see many problems that can be traced to individuals. We set up extremely high and fine standards for our solutions, our chemicals, and then we turn around without even a thought and manufacture or concoct some solution without thought of the responsibility. We are prone to criticize large organizations, but we quietly overlook our own faults. So I think that we can gain a lesson from that. I think that we can take pride in our larger organizations who have assumed a watch-dog role for all of us.

Many of our small, fly-by-night organizations put a pretty label on the package that attracts, I am afraid in many instances some of our own scientific minds, and they are peddling lethal compounds, some of which I, personally, have come in contact with. Not our major chemical manufacturers.

Now, of course, associated with that is a problem in human nature. Mr. Public is always looking for the other side of the rainbow. He is always hoping, and so he answers the advertisements, or he travels to

distant places because the interstate commerce laws prevent the pretty label package being sent through the mails or across state borders, and the Lord only knows what he takes.

Our cancer quacks run a billion dollar industry in this country, working on the failings of human nature. As was previously mentioned in discussion, we have the individual who is forever looking for that vial that will rejuvenate his life and happiness, without a thought to what is inside that vial. Granted, in most instances the products turn out to be harmless, and that is fortunate for all of us. But I think that we should take a renewed check-up on ourselves in the fact that we should stand by reliable standardized chemical products that we use and in the use of which we know with what we are dealing.

As was indicated, the progress of knowledge in the use of more and more compounds begins to create new problems. In proper hands, those problems can be met.

I can add but one more suggestion in line with the problems that lie ahead. Hormones have been indicated—and what I refer to is not necessarily a chemical, but somewhat related—and that is, the ever-increasing problem of disturbing the antibody system of our patients by injecting various compounds into that body. As time moves along the promiscuous use of blood is developing an antibody complex that most of us can't understand, and we don't know what the future will be. We are injecting solutions, in various instances home-made, that are not rigidly standardized, and we are upsetting chemical as well as antibody balance and creating a problem most similar to the private individual in the home. Our challenge is, then, to straighten out our own bailiwick. I think we can have confidence in our fine industries that are doing a fine job and a reliable job and giving us tools with which to live and work.

DR. FOULGER: Thank you, Dr. Aitken and Dr. Howard. Both gentlemen have brought into the discussion quite properly the field I deliberately omitted from the paper.

Antibiotics, hormones, whether natural or synthetic, or synthetic derivatives, lie in the field of drugs. Since the revision of the Drugs and Cosmetics Act in 1938 the Food and Drug Administration has extremely wide powers to control the entry into interstate commerce of a new drug. Most states have duplicated that law; Delaware has none.

The field of drugs is a field which is too complex to discuss in a paper such as this. It is really that field in which most hazards occur, and yet it is a field in which there should be most control, because ostensibly drugs are administered under medical control. Carelessness in allowing renewal of prescriptions, in making up too large a dosage, acts of that type as well as sometimes quite dishonest dealing on the part of patients and others, lead to many accidents. Certainly I feel the public should not be subject to the action of those active materials endocrines, whether they be natural or synthetic without very close medical control.

If I am correct, Dr. Aitken, I stated that I know of no place in Delaware where the Donora situation could be repeated. I know of a number of situations in the United States outside of Delaware, but those are all being watched very, very carefully.

The smog situation is a peculiar thing, and it would take too long to go into it. Millions of dollars are being spent in Los Angeles in the control of the atmospheric conditions. If one sees photographs of smog in the Los Angeles region, however, one realizes that much of it comes from the brush fires in the back yards of the people living there. The atmospheric peculiarity lies in the peculiar sulphur compound which doesn't seem to appear in other places and which is extremely irritating to the eyes, while in the Donora incident no serious concentration was found in the atmosphere to cause the final results. Of course we could use in explanation, the theory of stress. Anyone with impaired coronary-respiratory function in a situation in which the oxygen available to him in the air is reduced or it is made more difficult for him to get into his lungs because of coughing and sneezing and expectoration—any such person is under additional stress. Already, in other words, according to the theory, he is under stress from his disease and under the one stress he is less resistant to the second stress, and so on.

From many experiments done in the

Haskell Laboratory over the last 15 years, I feel that probably the explanation of the deaths in Donora and DeNoise Valley in Belgium in 1930 is on the theory of physical stress interfering first with respiration, secondly with the cardio-vascular system, complicated by the atmospheric conditions.

## INDUSTRY'S CHALLENGE TO MEDICINE*

R. RALPH BRESLER, M. D.,**
Philadelphia, Pa.

It has not been too many years ago since the family physician was forced, through necessity, to care for practically every medical problem that arose in the home. As medical science advanced, however, it became more and more obvious that no general practitioner could hope to obtain the training and absorb the knowledge necessary to become expert in all phases of the medical field. We saw, then, the rise of specialization—the channeling of postgraduate training into one particular specialty, and the funneling of study and training *into* that field. Today, our specialty system is well established and is apparently well-defined.

There is, however, an exception to this otherwise orderly system—one single specialty which cuts across the formal lines of demarcation of the other specialties, and which, at the same time, is tangentially a part of all of them. I speak of *Industrial Medicine*, the art and science of preserving the health of the worker.

Medicine in industry is *not new*. Physicians have been interested in the effects of occupation on health as far back as the fifth century, B.C. Hippocrates, the father of medicine, described the hazards involved in metal working, and recorded diseases found peculiarly among tailors, farm hands and fishermen. Throughout the development of medicine through the centuries, a scattered handful of men carried on that deep interest in occupational health. Pliny the Elder, Galen, Ellenbog, Paracelsus, Ramazzini—these are famous names in the annals of industrial medicine.

As civilization advanced and as the social and physical sciences developed, this sphere of medicine came more and more to the fore. Increasingly complex problems required increased technical knowledge. Expansion of occupational medicine into industrial relations, accident prevention, medical insurance, sanitation, workmen's compensation and job placement activities demanded of the physician an unusual variety of talents and interests. The men who can fulfill those requirements are our industrial physicians of today.

It is a strange situation that in a highly developed industrial civilization such as ours the role of the industrial physician has been so consistently misunderstood and misrepresented. This is particularly true, unfortunately, among the members of our own profession. The reason for this is not altogether clear, but it may well be due only to a lack of understanding of the work of the industrial physician—a lack of understanding of his functions, his techniques and his obligations.

I would like to clarify the position of the industrial physician in medicine, to explain some of his problems, and to outline the responsibilities *he* assumes in accepting the burden placed upon him by industry.

It must be emphasized at the outset that industry's interest in medicine and medical service *is not*—and never *has* been—humanitarian. Industry's interest is basically *economic* in nature. Industry has learned that the medical profession can help to attain that economic objective.

The goal of industry, understandably enough, is to keep as many men working at as many machines as many days as possible. It has not always been so simply stated. Shortly after the passage of the first effective Workmen's Compensation Laws in 1911, industry's main concern was in decreasing the direct cost of injuries sustained on the job, for which they had now become legally responsible. This was accomplished through establishing dispensaries and hospitals, for repair-shop surgery only.

Through the years, however, industrial thinking matured. There came about a growing realization of the economic costs of ill-

*Read before the Medical Society of Delaware, Wilmington, October 10, 1951

**Medical Director, C. Schmidt & Sons, Inc., Philadelphia; Associate in Public Health and Preventive Medicine (Industrial), Hahnemann Medical College.

ness-absenteeism, of idle machines, of high labor turnover, decreased production, poor product quality, of training new workers, of the many *in*direct costs of industrial injuries —all summing up in the eyes of industry to *increased production costs.* It was soon realized that there is a direct relationship between an employee's productivity and his health. It was recognized that the most expensive machine was no more efficient than the men who operated and maintained it. It was realized that *human* maintenance was just as important as machine maintenance. Medicine was—and is being—called upon more and more to render this service of human engineering and maintenance. This is not a simple problem. Consider these facts for a moment:

In the United States today, there are over sixty million people gainfully employed. Each of these people is, directly or indirectly, subject to some form of occupational health hazard, whether he be bookkeeper, truckdriver, welder, deep sea diver, executive, or trash collector. Each of these people, in the course of his daily work is subject to conditions which may adversely affect his health and well-being. Such health hazards fall into no particular pattern. Their sources are numerous and varied—their effects on the human great.

Occupational health hazards may be *biological* in origin: anthrax among wool sorters; brucellosis among farmers and meat handlers; the fungus infections of hide-workers, millers and cigar makers; the septic infections of fertilizer workers, butchers and glue makers; the rabies and tetanus of animal handlers.

They may be *physical* in nature, resulting from exposure to extreme heat, as seen in foundry and glass workers, or extreme cold, as seen among cold storage and frozen food workers. Conditions of constant dampness is a health hazard among steam vulcanizers, paper mill workers, fishermen, brewery workers. Deep sea divers and caisson workers are subjected to tremendously *in*creased air pressures; flying personnel to conditions of *de*creased air pressure. The occupational hazard of x-ray and radium for radiologists and x-ray technicians has long been known. Not so well known is the fact that industry is making increasingly greater use of the x-ray in manufacturing, particularly in the detection of hidden structural defects in metals. Hazards from radioactivity have been tremendously increased as a result of developments in atomic research. Adaptation of atomic engines to peacetime uses will further increase that hazard.

Occupational health hazards may be *mechanical* in origin. Electrical burns and electrical shock are hazards to linesmen, electricians and power-plant operators. Conditions of excessive noise, with resulting hearing impairment, are common. There are occupations involving vibration or repeated shocks, as seen among riveters or air-hammer operators. Other occupations require specific repetitive motions, as in furniture polishing, mail sorting, haircutting, writing. All of these cause their share of worker disability.

Perhaps the most widely recognized of all occupational hazards are those resulting from exposure to chemical substances, such as dusts, metals, solvents, gases and fumes. We have long recognized the silicosis of miners, stone workers and sandblasters, but perhaps have *not* recognized that silicosis is also a special hazard in many other occupations: the manufacture of ceramic ware, bricks, glass, and in many grinding, sanding and polishing operations. Lead intoxication is an old story in medicine, but how many of us recognize the very real hazards involved in the handling of mercury, beryllium, manganese, chromium, cadmium, and the many other metals now commonly used in industry? We may remember that the inhalation of carbon tetrachloride is harmful, but how many of us know of the dangers faced by the worker who must handle benzine, carbon disulfide, trichlorethylene, naphtha and hundreds of other industrial solvents?

The fact that these hazards may affect the human body in any of a number of ways makes the problem no less difficult. There are many inhalation hazards: the dusts of silica-bearing materials, the vapors of solvents and metals. There is a tremendous number of substances which have a deleterious affect upon the skin, as direct primary irritants, as secondary sensitizers, or in other

ways. Certain substances affect the gastro-intestinal system, others the genito-urinary system or the nervous system. There are effects upon the bones, muscles and joints. There are systematic diseases from occupational sources. There are many injuries and deaths from industrial accidents. In short, gentlemen, industrial hazards arise from numerous sources, manifest their presence in many ways, and may attack any part of the body. I have presented this somewhat grim picture to impress upon you the magnitude and extent of the industrial hazards of today. Certainly, science and industry together have made tremendous strides in the past few decades. With their progress, however, they have imposed upon the medical profession problems greater than ever before in our history.

I would like to mention a few practical examples. Each one of us has, at one time or another, prescribed nitroglycerine in the course of our medical work. We know that it is a powerful vasodilator and that it brings about a prompt physiological response in the patient. Yet how many of us have ever considered the problem faced by those who manufacture these little white tablets? Potent as it is in the patient, nitroglycerine is equally potent in the pharmaceutical worker who may inhale the dust or absorb it through the skin. It is similarly a problem for the explosive worker. "Nitroglycerine" or "dynamite headache" is severe, often incapacitating, and discouragingly difficult to treat. In its prevention, the industrial physician must recognize factors of individual susceptibility, the temporary immunity that may be acquired, the effects of weather and alcohol on nitroglycerine workers. In his job placement procedures, he must eliminate from such exposure those individuals most likely to react unfavorably (alcoholics, hypotensives, those with hay fever and chronic upper respiratory diseases). The physician must be familiar with dust suppression techniques, with exhaust ventilation mechanism, with respirators, goggles, gloves and other items of individual protective equipment. He must, in short, be able to effect changes in the working environment, as well as in the worker.

Each of us has used streptomycin. We are familiar with the hazards to the patient entailed in its use, but how much do we know of the hazard to the streptomycin worker? Here and there in the literature, within recent years, has appeared an isolated report of dermatitis in nurses preparing streptomycin for injection. In the manufacture of biologicals this presents a very real and hazardous problem. In a moment I shall show a few slides to illustrate just how bad this hazard may become.

I mention these examples to illustrate the fact that all of us are somewhat prone to take things too much for granted. The things we use in our professional work—biologicals and pharmaceuticals—the things we use in our daily lives—gasoline, clothing, food, electricity—these things are not bought with money alone. They may also be bought by the health of those making them.

Industry, gentlemen, has an economic interest in *curing* these conditions. It has an even greater interest in *preventing* their occurrence in the first place—and here lies a basic function of the industrial physician—*preventive medicine.*

Prevention, in industrial medicine, requires knowledge of a highly technical nature, knowledge not only of medicine, but of engineering, chemistry, physiology, physics and other fields. Not many physicians possess the breadth of interest to encompass these fields. Not many physicians will subordinate their clinical interest in the individual patient to a technical problem related potentially to a large group of patients. This the industrial physician is required to do.

Prevention, however, is not the whole story. In addition to medical problems, industry poses others, which, while not medical in nature, are nevertheless important in the administration of a health program in history. For example, the physician in charge of an industrial health department must also be an executive. He has a department to operate, personnel to hire (and fire, if need be), a budget to prepare and to live on, equipment and supplies to purchase, accurate and complete records to maintain. He must be able to hold his own on a level with other executives in matters of general company concern.

As Director of the Medical Department he has additional and special responsibilities. He assists in the formulation of medical personnel policies—sick pay, health insurance plans; he plays an active part in job placement and in accident prevention. In isolated areas, he is called upon to advise on problems of housing, water supply, sewage disposal, food supplies and preparation, and the prevention and control of communicable disease.

A basic responsibility, of course, is the care and handling of the injured worker, from the immediate first aid, through curative surgery, medical rehabilitation, and, most important for the individual, *re*-employment in a job commensurate with the worker's disability. In such cases, of course, the industrial physician calls freely upon the services of his colleagues in the other specialties, but basically the responsibility for the patient's progress and eventual occupational rehabilitation is his.

The demands made of the physician by industry seem great, yet even these are not all. In order to improve employee health and thus decrease absenteeism, the industrial physician must initiate an active health educational program, to teach employees how to prevent colds, the importance of proper diet, the necessity for routine health examinations, and so on. He is expected to organize and train *first aid teams* among the employees. As a result of the present world situation the industrial physician now plays a vital part in company defense planning against atomic attack. Certainly, he must have an adequate knowledge of Workmen's Compensation legislation. He must establish and maintain a complete system of medical records.

The industrial physician must be impartial and unbiased. He must base his decisions upon truth and equity, rather than on pressure from management or the union. He must be a diplomat par excellence. He must be a psychologist. He must be gregarious and like people.

These, in a rough and incomplete way, are the "musts" for the industrial physician. It is obvious, I think, that no single one of our regularly recognized specialists—be he surgeon, dermatologist or ophthalmologist—can handle this vast variety of problems. The demands of industry have created this new type of specialist, the industrial physician. He is, to begin with, a capable all-around physician. He has an unusually wide breadth of interests, and has had both didactic and in-plant training in industrial medical problems. He must have a scientific and orderly mind, an inquiring nature, a dogged determination to find a cause, and the tenacity of purpose to achieve a solution. He must have a knowledge of production problems, an appreciation of the responsibilities of management, yet be able to visualize and understand the problems of the worker. He must maintain a high degree of respect from his medical colleagues, respect not only for his professional skill, but for his ethical conduct and his willingness to cooperate in every way with the private practitioner. He must, through his activities, be able to show the other members of the profession that in the industrial physician they have a friend and an ally, not a competitor.

This, then, is industry's challenge to medicine. It is a tremendous challenge, yet one which the medical profession *must accept.*

Man, as an agent of production, is the *greatest of our resources* in this industrial civilization. It follows logically that the best investment society can make is *in those human resources,* and their conservation and development. The industrial physician applies the art and science of medicine in such a way as to make the greatest possible contribution to that conservation and development. *This* is our answer to industry's challenge to medicine.

*127 Edward Street*

DISCUSSION

DR. L. C. MCGEE: (Wilmington) After listening to Dr. Bresler's outline of what is required of the physician serving the patient in industry, I think most of us would have to think that we are mis-cast in that we are utterly unable to approximate all of those qualities.

In the capitalistic system we find reference here and there to the "profit motive." Possibly it is unfortunate that the profit motive has been handled as it has. If industry is to provide things for better living and better things for more people, it is obvious that in-

dustry must continue to exist in a financial way in order to produce those things, and the profit motive there has a similar or the same relationship that it has to the physician in practice or to the hospital. If the hospital can not make ends meet, it must close its doors and no longer render service to the patients. If physicians can't maintain their car, their office, and get the books and other items required beyond the necessities of food and clothing, he can no longer serve his patients. It is quite true that the application of medicine to industry requires not only all the disciplines we know in medicine, but many of the scientific disciplines outside of medicine.

The challenge to the industrial profession is protection. The record of our entire profession is that we find the best solution to disease when we can prevent it. Many physicians here today can recall the hours and hours spent in treating scarlet fever in Delaware. That was solved by prevention. It required the techniques of the bacteriologist, the contributions of the water and milk chemists and knowledge of personal sanitation and many other things added together for us to bring under control this particular disease. It is highly desirable if I were at the scene of an automobile accident and there is a fractured pelvis to deal with that I have the technical know-how to help me. But I would much prefer—and I believe you agree—that the ultimate solution of the highway accident problem would be that of prevention; adequate roads, drivers and vehicles, so that the repair jobs would become less necessary.

As we looked at the slides that were presented, I, personally was not aware of the highly sensitizing qualities of the streptomycins in contact with the skin. Probably some unrecognized cases of dermatitis may have been due to the handling of streptomycin and we should keep that in mind.

The evidence of sensitization to light from the new types of fluorescence is of interest in view of the spectral characteristics of such light, and I wonder if those patients are not photosensitive, akin to those patients that can't stand much sunlight. It would be interesting to know whether Dr. Bresler made observations of photosensitivity to other types of light, both natural as well as artificial.

The reason the emphasis has been placed on the challenge which industry presents to us may be seen, I think, in or from the peculiar demands placed upon professional medicine from our industrial civilization. There are certain things we didn't ask for that we are given to do. Yet we cannot avoid them. I am quite sure that we never asked for the chore of recording births and deaths, yet early civilization must have recognized there was need for such information, and the logical person to take care of that was the doctor. Many are the things which we have had to do without necessarily wishing to do those things. But we have recognized those things and accepted the fact that we are in better position to do them by virtue of our training and experience than are the other citizens in our civilization.

And the same is true of industrial problems. I can only take but one example—that is, the matter of job placement. These fellow citizens of ours are entitled to earn their bread and butter. Some mechanisms of feeding them must be found. It is better that we have the ability to place those people in jobs where they are not going to suffer from dermatitis—and who is in better position to understand the type of placement required than is the physician?—because he must know some of the mechanism of the disorder, the dermatitis, or whatever it be. Therefore is the combination of mind and heart and hand of the physician better capable of handling these many problems, some of which are medical, some of which are personal relations, some of which deal with man as an animal. So long, then, as the requirements of these people are found in the medical profession, we will have the demand for our services in these services, just as we have the demand for our services in many other fields.

Dr. A. J. Fleming: (Wilmington) I couldn't help think, as I listened to Dr. Bresler's description of the industrial physician, that maybe we are a grossly underpaid lot, if we are supposed to have all those qualifications.

Time is getting on, and I will confine my-

self to three aspects of the matter of industrial medicine under discussion.

Dr. Bresler did not exaggerate one particular point, that is, the absolute necessity for the industrial physician is, No. 1, to be full-time at the job, because to do the job properly the industrial physician in charge of the plant must thoroughly know the operations throughout that plant if he is to adequately give preventive medical care to the people under his guidance.

I am sure that Dr. Foulger and his staff at Haskell Laboratory not only has the knowledge of one plant but 70 to 80 plants throughout the country, as well as several hundred operations which are involved in those plants, in order to adequately give advice on toxicology and other industrial medical matters to the medical staff throughout the country.

One minor point on which I would appeal to the members at large here is the problem of taking a little more realistic an attitude toward convalescent periods. It has always been somewhat of a mystery to me why in the non-complicated appendectomy the physician kicks the patient out of bed in two or three days and sends him home, and then has the affrontery to say: "I think you had better take three or four weeks off the job."

I have one other phase that follows on Dr. Cline's remarks last night: It is definitely part of the industrial physician's duty in his position in medicine to scrutinize proposed laws pertaining to medicine, especially in industry. Already, in Rhode Island and Michigan they have rather ill-conceived and more or less unworkable laws concerning medical service in industry, and an attempt has been made to submit such a law in Pennsylvania. Those laws in Rhode Island and Michigan were pushed through very much in the quiet, without the medical profession really being aware of them until they were on the books. An important feature of proposed legislation of this type is that medical installations in industry are to be put under the administration of the Department of Labor. Now you can underline that statement, for it appears that under this form of socialism that the department of health in the average state is to have little or no say in medical matters, and certainly as pertaining to industry.

If you think for a minute that the dubious characters in Washington that have been working to establish socialized medicine are dormant, examine carefully such state legislation pertaining to medicine in industry, and you will see that a cleancut attempt is being made to push socialized medicine in the back door on a state-by-state basis; and if such laws were to become general it would involve a tremendous number of our physicians throughout the country who do full-time industrial work or even part-time industrial work.

Under such laws what would happen, of course, is that the bulk of the physicians and control of industrial medicine would be put under the Department of Labor, and I suppose as an outcome, physicians, like other people loosely associated, would be unionized. The unionization of physicians and surgeons! And I can easily visualize that under that setup we would in ten or fifteen years be seeing jurisdictional rows between the physicians of the A. F. of L. and the CIO physicians over who should treat a fracture of tibia!

So, it behooves us to be alert to this type of industrialization; it was through the work of groups working with industry against that very obnoxious bill presented to the Pennsylvania State Legislature that the bill was effectively killed.

DR. BRESLER: The problem of photosensitivity that Dr. McGee mentioned brought up another qualification of the industrial physician that I did not mention; that is, in many cases he must also be a "detective."

This very innocuous dermatitis gave us no end of trouble. We first heard about it when several of the girls in the Biology Department came to the dispensary complaining of the dermatitis that they noticed only when they worked in one particular room. We noted that it appeared on Tuesday and lasted all week; then disappeared over the week-end. By Monday night it was back again. It was a peculiar history.

Our first thought was the possibility of sensitization from one of the numerous sensitizing substances they were working with—biologicals, liver extracts, penicillin extracts,

and so forth—but the big problem was that they handled these same things in other rooms and the dermatitis didn't appear anywhere else but in the one particular room.

When we examined the dermatitis clinically it resembled plain, ordinary sunburn. We knew that each of the rooms had what we call safety-lights—ultraviolet lighting over each of the windows and door, technically supposed to have guards on, and theoretically there could not be eposure to the ray of the ultraviolet lights. However, to play safe we ordered the lights shut off entirely for two weeks. In spite of that, the dermatitis continued.

We then thought there is just a bare possibility that the dermatitis might be due to sensitivity to ozone. But the cutting off of the ultraviolet lights eliminated the ozone, as well. But we thought that since the room was air-conditioned there might be a spark gap somewhere.

We then switched our girls around, putting some of them in another room where they handled exactly the same thing. The girls that remained in the "mystery room" continued to get the dermatitis; the others didn't.

We finally sat down and piece by piece itemized every single bit of equipment in the affected room and in the other rooms where the girls were working. We found equipment-wise they were exactly alike. The only difference was the work table of the affected room was illuminated by fluorescent light and in the other room by incandescent light.

In all fairness to the manufacturers of fluorescent equipment, these people had an unusual exposure—they were in direct contact with the fluorescent light at a distance of not more than eight or nine inches, for as long as eight hours a day, five days a week. It seemed rather far-fetched that the minute amounts of ultraviolet given out by the fluorescent tube could be giving the dermatitis.

We constructed a simple plate-glass shield to completely surround the fluorescent tube on one of the two work tables in that room and found, to our delight that the girls working on that particular table no longer had the dermatitis. We kept them working on the table for a week. The girls on the other table had the dermatitis. These over here, as I say, did not. Then we switched the other girls around and found the original girls got the dermatitis, and proved to our own satisfaction that under certain special conditions —and I must insist again, ordinary fluorescent lighting will give no trouble—under certain highly specialized conditions of exposure, these types of dermatitis could occur. But it took much wracking of our brain before we found that out.

## RETROLENTAL FIBROPLASIA*

P. ROBB MCDONALD, M. D.,**
Philadelphia, Pa.

Retrolental fibroplasia is a comparatively new disease of premature infants and is the most important cause of blindness in young children. The syndrome was first defined by Terry[1] to describe what he thought was an opaque tissue that developed behind the lens. He noted that the eyeballs were small, the anterior chambers shallow, and that the irides retained their foetal blue color. He also noted that posterior synechiae developed, though if the pupils could be dilated the ciliary processes could be seen like the teeth of a comb in the extreme periphery. The retrolental membrane may only involve one portion of the retrolental space or it may be limited to the periphery, causing a localized detachment of the retina.

Terry felt that the disease was due to embryonic tissue, which developed in a meshwork of a persistence of the tunica vasculosa and that it developed after birth. Recent[2] studies have shown that primarily the disease is confined to the retina and only secondarily involves the vitreous. Histologic sections of the retina show marked dilatation of the retinal vessels with abnormal capillary budding and proliferation of both endothelial and glial cells. At this stage retinal hemorrhage usually occurs. This may be followed by organization of the hemorrhage in the vitreous leading to partial or complete detachment of the retina.[3] The term retrolental fibroplasia is really a misnomer and applies only to those cases with a complete retrolental membrane. Heath[4] has suggested the

*Read before the Medical Society of Delaware, Wilmington, October 10, 1951.
**Attending Surgeon, Wills Hospital.

term retinopathy of prematurity, which is really more appropriate.

Though we know little if anything about the etiology of the disease it can be stated that the incidence of the disease has increased materially during the past decade. It has increased out of all proportion to the increased survival of premature infants, so cannot be ascribed to that factor. The incidence of the disease varies considerably in different localities, though few institutions have published the results of routine periodic ophthalmoscopic examinations of all premature infants.

## ETIOLOGY

Kinsey and Zacharias[5] reviewed all the reported statistics in 1949 relative to the incidence of retrolental fibroplasia. Their report emphasized the previously known fact, that the disease is more prevalent in premature infants weighing 3 lbs. or less and that anywhere from 12-25% of this group developed retrolental fibroplasia. They investigated the parity, age of mother, Rh type, type of delivery, anesthetic agent, cause of prematurity, single or multiple births, sex of the infant and other miscellaneous factors. Their most promising lead was that the incidence of the disease correlated with certain changes in treatment, i.e. the use of vitamin supplements in water miscible form and the increased use of iron.

Exline and Harrington[6] have recently reported on the incidence of retrolental fibroplasia at the Charity Hospital of Louisiana at New Orleans. No cases of retrolental fibroplasia were found in 80 infants weighing less than 1500 grams at birth. The children were all followed and examined after the age of 7 months. Their cases were analyzed in the same manner as those of Kinsey and Zacharias in an attempt to discover how the clinical management of these infants differed from that in areas with a high incidence of retrolental fibroplasia. No single cause was found, though suspicion as to etiology was directed at high potency water soluble multiple vitamin preparations, liberal iron supplementation or excessive neonatal weight loss.

Unsworth[7] has suggested that the anemia of prematurity might be a factor in etiology. The Owens[8] felt that retrolental fibroplasia might be due to a deficiency of vitamin E. They based their thesis on the following premise: (1) Premature infants have a defective fat absorption so a low fat diet is usually prescribed. The child is usually given vitamin supplements, but E is not included. (2) That vitamin A and iron increase the requirements of vitamin E. (3) The pharmacologic action of vitamin E as an antioxidant could have a beneficial influence on the metabolism of the retina.

Reese[9] has made an interesting observation on the occurrence of skin hemangiomas in patients with retrolental fibroplasia. Skin hemangiomas are found in 3-10% of premature infants, but in those with retrolental fibroplasia the incidence was 15%. He also noted that 80% of skin hemangiomas make their first appearance between the first and sixth weeks of postnatal life. This development of the angiomatous process parallels to some extent the development of the angiomatous process in the retina.

## CLINICAL COURSE

The Owens[10] deserve credit for first describing the clinical course of the disease. They started examining all premature infants at the Johns Hopkins Hospital in July, 1945. In order to examine these infants their pupils should be well dilated and they should be adequately restrained. General anesthesia is unnecessary. Two drops of a mixture of 4% homatropine and 1% paredrine in each eye usually provides maximal dilatation. At birth one usually sees some evidence of a pupillary membrane and there may be some evidence of remnants of the hyaloid system. The vitreous is usually hazy, especially in the periphery and may obscure a good view of the fundus. This haze may also be caused by a thick mucus-like precorneal film[11] The nerve head appears pale. The vessels at birth appear normal or slightly attenuated. After 2-3 weeks the vitreous haze clears and the retinal vessels frequently become dilated, especially the veins. Peripheral greying of the retina is also noted.

No cases of retrolental fibroplasia have been noted at birth. The fundus changes of impending retrolental fibroplasia are usually first appreciated between the third and sixth

week after birth. They consist of marked dilatation and tortuosity of both arteries and veins. There is peripheral greying and elevation of the retina, as well as the occurrence of retinal hemorrhages. This is known as the acute stage of the disease. It has been noted by some in 50% of prematures weighing less than 3 lbs. at birth. Fortunately regression is common and only about 12% show evidence of the cicatricial phase. If during the acute stage neovascularization and transudation are noted in the periphery spontaneous regression is rare. When this occurs the retinal oedema usually progresses and the disc becomes blurred. The greyish mass of retinal detachment billows forward and a membrane appears to form in the retrolental space. A complete membrane may form by extension of the peripheral folds. Broad ciliary processes may be seen extending on to the membrane and numerous vessels may be present on the surface. The membrane need not be complete and at times a central funnel remains through which a red reflex is visible. In other cases there may be only peripheral detachments with cicatricial bands in the vitreous.

The disease is usually bilateral, though it may be more extensive in one eye than the other. The eye with the complete membrane is usually smaller than the one with a partial membrane. The anterior chamber is shallow and the iris is poorly developed.

From January, 1950, through July, 1951, 70 premature babies were born at the Lankenau Hospital. Of this number 60 survived. All babies weighing less than 4 pounds were examined routinely. Of the 14 babies in this category 12 showed the typical fundus changes of prematurity and in 4 the changes were considered severe enough to warrant special therapy. These infants were all followed until any suggestive ocular changes had regressed. No evidence of the cicatricial phase of retrolental fibroplasia was noted in any of this group. One child weighing 2 lbs. 15 oz. at birth was found to have spherophakia. The babies were all given multivitamin preparations in other than a water soluble form, supplemented by vitamin E and vitamin C.

### Complications

The most common complication of retrolental fibroplasia is secondary glaucoma. It is usually associated with posterior synechia and a shallow or flat anterior chamber. The glaucoma can frequently be controlled with the use of miotics, though the vision is usually destroyed or reduced to light perception only. Surgery may be resorted to, though it is of little benefit, since blindness ultimately follows. Enucleation may have to be resorted to for a painful blind eye.

### Treatment

The treatment of retrolental fibroplasia has up to the present time been very discouraging. The Owens[8] originally felt that the administration of vitamin E materially reduced the incidence of retrolental fibroplasia. They have subsequently modified this view,[12] though they feel that it reduces the severity of the process. This has not been confirmed by other investigators as Reese[9] and others have not found any correlation between vitamin E blood levels and the incidence or severity of the condition. Reese[13] feels that ACTH is of definite value when given in the acute stage of the disease; 20-25 mg. are given daily for 14 days. Treatment is only started if, in addition to large dilated vessels, there is beginning peripheral detachment. This is the schedule I followed at the Lankenau Hospital on the 4 babies referred to previously. It is extremely difficult to evaluate therapy in the acute stage since spontaneous regression is the rule rather than the exception. I do not feel that any conclusions can be drawn from the few cases I have seen or treated at the Lankenau Hospital. Further studies with a larger series and therapy to alternate cases must be undertaken before definite conclusions can be drawn.

In fully developed cases treatment is directed to the prevention of the complications, other therapy is of little, if any, value. King[14] recommends the use of a mydriatic 2 or 3 times a week to prevent the formation of posterior synechia. This is followed in several hours by the instillation of a miotic. Surgical removal of the retrolental membrane as suggested by Reese[9] has not met with universal approval. He has reported on 52 cases that have had surgical removal of the

membrane. Of this number 27 were unchanged, 16 worse, and 8 had objective improvement, but questionable functional improvement.

## PROGNOSIS

It is obvious from the preceding discussion that the prognosis in retrolental fibroplasia is poor. Even in the acute cases with spontaneous regression high degrees of axial myopia are frequently seen. Though this is better by far than blindness it may be a severe visual handicap. King[14] in a series of 238 patients with retrolental fibroplasia reported the visual acuities in 210. Of this number 33% were totally blind, 33% had light perception, 22% could reach for objects, and 12% had 20/200 or better vision, and of this last group 5 were full term infants.

## CONCLUSIONS

Retrolental fibroplasia is a hazard of premature birth. It is the greatest cause of blindness in young children today. There is considerable geographic variation in the incidence of the disease. The pathological process is primarily confined to the retina and develops after birth. Spontaneous regression fortunately is common. There is no specific therapy, though ACTH may prove to be of some value.

*1930 Chestnut Street*

### REFERENCES


1. Terry, T. L.: Extreme Prematurity and Fibroplastic Overgrowth of Persistent Vascular Sheath Behind Each Crystalline Lens, Am. Jour. Ophth. 25:203, (Feb.) 1942.
2. Friedenwald, J. S.; Owens, W. C.; Owens, E. U.: The Pathology of Retrolental Fibroplasia, Trans. Am. Ophth. Soc., 1951 (in press).
3. Laupus, W. E.; Bousquet, E. P.: Retrolental Fibroplasia, Am. Jour. Dis. of Child. 8:617, (May) 1951.
4. Heath, P.: Retrolental Fibroplasia as a Syndrome, Trans. Sec. of Ophth. J.A.M.A. :128, 1949.
5. Kinsey, V. E. and Zacharias, L.: Retrolental Fibroplasia, J.A.M.A. 139:572, (Feb. 26) 1949.
6. Exline, A. L. and Harrington, M. R.: Retrolental Fibroplasia. Jour. Pediat. 38:1, (Jan.) 1951.
7. Unsworth, A. C.: Retrolental Fibroplasia or Ophthalmic Dysplasia of Infants, Trans. Am. Ophth. Soc. 47:738, 1949.
8. Owens, W. C., Owens, E. U.: Retrolental Fibroplasia in Premature Infants, Am. Jour. Ophth. 32:1631, (Dec.) 1949.
9. Reese, A. B. and Blodi, F. C.: Retrolental Fibroplasia. Am. Jour. Ophth. 34:1, (Jan.) 1951.
10. Owens, W. C. and Owens, E. U.: Retrolental Fibroplasia. Am. Jour. Ophth. 32:1, (Jan.) 1949.
11. Tyner, G. S.: Ophthalmoscopic Findings in Normal Premature Infants, Arch. of Ophth. 43:627, (June) 1951.
12. Owens, W. C. and Owens, E. U.: Retrolental Fibroplasia, Wilmer Residents Meeting, Baltimore, 1950 (unpublished).
13. Reese, A. B., Blodi, F. C., Silverman, W. A. and Locke, J. C.: The Influence of ACTH on Retrolental Fibroplasia, Trans. Section on Ophth. J.A.M.A., (June) 1951 (in press).
14. King, M. J.: Retrolental Fibroplasia: Clinical Study of 238 Cases, Arch. Ophth. 43:694, (Apr.) 1950.


## DISCUSSION

DR. W. O. LAMOTTE, JR.: (Wilmington) The paper which has just been presented is an excellent summary of the present status of this dread disease of immaturity, and I would like to take this opportunity to thank him on behalf of myself and on behalf of the Society for coming here from Philadelphia to present this material to us today.

It happens that in Wilmington we have a locality in which there has been a comparatively large incidence of this disease. In discussing this paper I shall confine my remarks to emphasizing this point by bringing to you a few local statistics.

It will be recalled that in Dr. McDonald's opening remarks he made the statement that this appears to be a comparatively new disease. That would be upheld by our experience here, in that there is no known case on record in Wilmington before 1947. The first known case was born September of that year. Since that time we have accumulated approximately 30 cases of infants who are either completely blind or so nearly so that their education will have to be planned along visually-handicapped lines.

The statistics that I will mention are derived from the premature service of the Delaware Hospital, which has the largest premature service in the state of Delaware. Of these 30 cases or so, 27 of them were from patients who had been admitted to that service. Several others have been observed, namely, 2 that I know of in Wilmington General, and 2 from down-state. Of these cases from the Delaware Hospital all were 4 pounds or under at birth with 3 exceptions, they being between 4 and 5 pounds. The over-all incidence of the disease developing in infants weighing 4 or 5 pounds at birth is 24 cases out of the total of 71 who survived the 4-year period from July 1947 to July 1951, an incidence of 33.8%. In other words, there is about one chance out of three here for an infant weighing 4 pounds or under at birth of developing this disease in a crippling form.

Of these 71 cases, 18 during this 4-year period were under 3 pounds at birth and these developed the disease for an incidence of 44.4%; the remaining 53 were between 3 and 4 pounds, of which 16 developed the

disease or an incidence of 30.2%. Thus, the incidence is higher in the smaller babies, but is distinctly higher in the 3 to 4 pound birthrate than has been reported in other localities.

In the year from July, 1949 to July, 1950, following the report of the Owens', on the effectiveness of vit. E., I instituted the practice of giving all infants 4 pounds or under at birth vit. E., in these cases. These infants had plasma levels run and in all cases were considered adequate.

During that year there were 23 infants of 4 pounds or under at birth who survived, and 9 of these developed a crippling form of retrolental fibroplasia, an incidence of 49%. It was concluded, in our hands at least, that vit. E. had no effect in decreasing the incidence of the disease or in attenuating its final form.

In the year July, 1950 to July, 1951 vit. E. was not used routinely in the prophylactic sense, but the infants were simply placed on dietary regime as recommended by the Owens. During that year there were 18 infants of 4 pounds or under at birth and 7 of these have developed the disease in crippling form, an incidence of 38.8%. Three of the infants during the later year received ACTH in high doses, started in the earlier vascular phase of the disease, but at the present time no evidence is forthcoming that it has effectively influenced the end result.

Thus from year to year the incidence in Wilmington remains high. It doesn't seem to vary greatly from year to year in the years it has been seen, and has not been influenced by the therapeutic measures undertaken to date. We are thus faced in Wilmington with a community problem, when, thrust upon a community of this size there are 30-odd blind babies.

This situation has been met forcefully by the interest of the parents concerned, by local civic organizations, the Delaware Commission for the blind, and the State Legislature. We are also confronted, however, here, with a potential problem of clinical investigation of a disease which, as Dr. McDonald mentioned, is now the commonest cause of preschool blindness, and it is something that we can do only with the cooperation and the help of the obstetricians and pediatricians, for this disease certainly is a fundamental alteration of the physiology of the premature baby. I think we are about to hear something of the pediatrician's point of view in this regard.

Dr. R. O. Y. Warren: (Wilmington) Actually, I know very little about this disease, and may I paraphrase Will Rogers: "I only know what I have read in the literature," and have found out by talking to people like Dr. LaMotte about the disease. Consequently, from the standpoint of discussion, this is going to be very rambling and may or may not add anything to the picture of the disease.

The one thing that stands out about the disease is the utter confusion as to etiology, and why it appears. It is interesting to note, in looking over some of the material, that the disease has appeared principally in the larger centers. Of course cases have been reported elsewhere, but in any large incidence it has appeared principally in the larger centers.

Therefore, I would wonder, first, whether or not this disease may be missed frequently in other parts of the country and of the world. This is borne out by the fact that when this condition was drawn to the attention of people in France, they saw the disease, and in one hospital in Paris alone within a week after they started looking for it, they turned up four cases of the disease. Sweden seems to be one country where the disease does not occur.

It is also interesting to note that in New Orleans, at the Charity Hospital, Dr. McDonald's report mentioned cases down there that all seemed to come from the indigent classes. They were all fed on evaporated milk. It was suggested that perhaps it was a matter of breast milk feeding. There have been a great many cases in one of the private hospitals in New Orleans, however. You will remember in Dr. McDonald's remarks he said the disease was first described by Terry, and Terry described retrolental fibroplasia, but in the further studies of the disease by the Owens and others you will find actually it is a "retinatrophy" of prematurity, and it seems to me, as a non-ophthalmologist, that there has been little effort to grade

the various forms of the disease. Hence, I would ask of myself and ask of the ophthalmologist, whether this maybe should not be done—and also would ask them if maybe this were not a new disease, but a disease that has grown in its complications, such as retrolental fibroplasia over the years, and perhaps it is a disease that we have had with us right along.

It seems that up to the time that this disease became evident, no thorough study of the premature infant had ever been attempted before, and it was felt to be a "no-man's land" of pediatries and of ophthalmology.

My last remarks are the result of interest that was provoked in me, personally, by the report of a writer from Boston whose name I can't remember, on Anoxemia in Pregnant Mice. By taking pregnant mice up to 2500 or 3500 feet elevation they could provoke all kinds of deformities because of anoxemia that resulted from the high altitude experience. I would wonder, as a pediatrician, whether or not anoxemia hasn't got something to do with it.

I would wonder, despite the fact it is said that everything has been exhausted in studying the history of delivery, whether, if we go back far enough in the history of the mothers to find out if there had been a period of anoxemia, whether that might possibly be a factor?

That may be just wishful thinking on my part and not scientific, but I was intrigued by the results that they showed.

Also, I think anoxemia may come in because we know that one of the problems in the care of the premature infant, is to prevent anoxemia in the early months of the life, at times. Nobody seems to be agreed that this has been absolutely ruled out, that prenatal factors have no part in this disease, at all. Actually, the earliest signs, I gather from the Owens, may take place from ten to fourteen days. Somebody suggested this might simply be an incubation period from the time the baby was actually born. So, all in all, there are many interesting facets that we as pediatricians are extremely interested in. I was talking to a young resident a week or so ago of one institution, who suggested that maybe it was better to start feeding the tiny ones from the time they were born.

It is interesting to note that in some parts of the country the incidence has had marked rise and fall, and in other parts of the country, as in Wilmington, there has been a steady incidence, more or less, of the cases. It makes one feel rather hopeless trying to help these poor little infants, but I think perhaps in time, given the aid and assistance of the obstetrician and the scientist, that maybe all of us will be able to prevent this dread crippling disease.

DR. ANDREW M. GEHRET: (Wilmington) Frankly, I am wondering whether this problem shouldn't be dumped in the laps of the obstetricians, rather than the pediatrician and ophthalmologist.

As Dr. LaMotte just now stated, he cannot find record of a case of retrolental fibroplasia previous to 1947, and I know, in doing some deliveries previous to the war, I can't recall any, even though I am sure I had some premature babies. I am wondering what there is that we may be doing that might be causing this. And one of the things that just now occurred to me is the possibility of the use of demerol, even in small doses, which might coincide with Dr. Warren's theory of anoxemia. This might not be the place for it, but now I am going to ask Dr. Cutler if he will designate one of the men of his staff to meet with the obstetricians some Friday morning, to discuss the problem.

Another thing—and this I will direct to Dr. Handy. Approximately a year ago I heard an observation made by one of the nurses in the Premature Nursery that those babies who were treated with whole blood developed retrolental fibroplasia far more often than those were not so treated. Has anything been done on that?

DR. MARGARET HANDY (Wilmington): I think that has been proven not true.

DR. H. H. STROUD (Wilmington): I was just wondering about two things that I thought possibly Dr. McDonald might be able to answer. One is, that it has been believed for some time that fetal inflow doesn't carry so much oxygen in the hemoglobin as does the adult hemoglobin, and I was wondering if there were any cases of Rf in those who

had received exchange transfusions. I wondered if anybody had perhaps replaced hemoglobin in the treatment of the disease. That was one question.

The second question I wanted to ask was—it hasn't been too long since Gordon and Levine suggested using low fat diets for prematures—whether there might be some relationship between the Rf and the use of half-skimmed milk mixtures.

Dr. E. M. Mayerberg (Wilmington): First I would like to ask Dr. Gehret and any other obstetricians here whether there has been any change in the prenatal care of pregnant women. I think the answer to this will be found somewhere from the period of conception right on up to the time the patient delivers. I wonder if they are giving any new drugs in the preparation of these women for the care of their child while carrying them? I know they give vitamins and calcium. But has there been any change in the technique of the prenatal care? The answer some day will be found there, somewhere, I believe.

Now, the next question is this, to the obstetrician: When children are premature, when they develop the condition, I understand it is usually somewheres in and around the sixth month. Now, are these children born spontaneously, without any previous trouble, or are these mothers in trouble from the second or third month? For instance, do they spot after the first or second or third months? Are they put to bed and permitted to stay there, or instructed to stay there until those symptoms disappear and then are they permitted to get up until they get in trouble again? And is that a continuous process in and out of bed, with this thing of hemorrhage going on, and then with the delivery at six months? Or, are these patients put to bed for three or four months and then, finally permitted to deliver at six months?

I think the answer is somewheres in between there—either prenatal care or permitting these patients who ordinarily would abort to go on. I may be hard-boiled, but I would say, if a woman was having that much trouble, if she carries the baby, well and good, but if she can't carry it she ought to lose it. Thank you, sir.

Dr. N. L. Cutler (Wilmington): I want to ask the speakers whether the statistics for this disease are following along with the increased incidence of survival of premature infants? It is my impression that it is not directly correlated in this respect.

I also would like to ask the pediatricians—it probably is primarily a question for the obstetricians, along the line Dr. Mayerberg suggested, that is, are strenuous efforts being made to prevent premature births, to prevent infants from being born prematurely?

The idea occurs to me, if no treatment is yet available, ophthalmologically, can the condition be handled by the obstetricians by perhaps some change in the care of patients, such as Dr. Mayerberg has suggested, whereby the incidence of prematurity can be reduced?

And I would like to ask Dr. LaMotte, in regard to the local incidence of premature births, whether the survival rate of prematures in Delaware has undergone a marked change. I assumed it has, since Dr. Handy has taken such an active interest in the premature clinic.

Dr. Handy: We have had one instance here of identical twins: one developed retrolental fibroplasia and the other one did not. If that is true, it doesn't seem to me we can necessarily feel that the maternal influence or anything done to the mother plays any part in the thing. I would like to know what Dr. McDonald thinks about that.

Dr. B. R. Vincent (Wilmington): Dr. Reese points out the similarity of this condition to hemangioma. He also describes a type of hemangioma that occurs in the infant around the orbit, that recedes spontaneously.

Now, in some of the retrolental cases, spontaneous recession does occur, and I have often thought of the possible good that might come of investigating these cases, histopathologically, along that line. I would like Dr. McDonald to comment upon that.

Dr. Gehret: At the present time we have in the hospital a baby which Dr. LaMotte is to see shortly. The mother came to me first as an habitual aborter. She was placed on increasing doses of stylesterol and she rigidly followed the regime. Unfortunately, she ruptured the membranes in three weeks and was delivered of a 2 lb. 12 oz. baby. She took

stilesterol along with the usual medications, as the only one, therefore, in which we might get some clue.

DR. LAMOTTE: The only comment I'll make is in reference to the question about relationship between the incidence of this disease and the survival rate in Wilmington. It is true that the survival rate from premature infants is greater at the present time than in former years, but it is also startlingly true that the incidence of the disease is far out of proportion to the increased survival rate. So I don't believe there is any connection whatsoever between the disease and increased survival rate.

DR. FANTAZIER: How many of these patients get stilvesterol, in all these that are trying to abort, and you stop them, and they finally go on?

DR. GEHRET: I can't quote statistics.

DR. E. F. FANTAZIER (Wilmington): There is one question I want to ask: Since we are dealing with the sitiologically premature infant, not come to term and nourished by the mother's blood, I wonder whether findings have been made transfusing blood from the mother that has reached the last trimester of term, in that there might be an extract in the blood that might prevent that condition or those conditions.

Instead of going to all the vitamines and hormones and whatnot, that might be the more natural process of the treatment of these children.

DR. WARREN: I would like to answer Dr. Fantazier's question. That has been done—to transfuse babies with mother's blood in the last trimester of pregnancies and has shown no effect upon the disease at all.

Now there is one thing that nobody has brought out that further confuses the issue: the disease may occur in one eye and leave the other eye perfectly free.

DR. MCDONALD: I place no statistical significance on the few cases I have reported from the Lankenau Hospital. The slides that I showed, from Boston, were all of children examined carefully by the same ophthalmologist, where there was considerable yearly variation and seasonal variation, and I think Wilmington is the only one that has been reported as having a high or as high an incidence, continually. But I think the more diligent an investigator you have the more cases you will find, especially of the category retrolental fibroplasia. That is one of the main problems in the disease, I think; that is, I don't think we have decided what is the upper limits of norm, in premature babies, and when an acute retrolental fibroplasia begins.

Dr. Warren says there is considerable "confusion." I hope he didn't point his finger entirely at the ophthalmologist. We are confused, yes. We have tried to classify the disease, and Kinsey and Chisholm in their latest paper offer much the same classification that the rest did—that is, they classify the degrees in the change, what goes on, the set attrition stage, and so on.

Retrolental fibroplasia, as has been pointed out, is no respecter of the social or economic status of the parents. It is usually bilateral, although it can occur unilaterally, and most of the latter cases have occurred in full-term infants.

In answer to Dr. Stroud, as far as I know, the dietary regimen of these babies has been investigated very thoroughly and many investigators now are tranfusing children at the slightest sign of anemia. I don't know whether they have used any adult hemoglobin, however, in trying to correct this.

In answer to Dr. Vincent, investigations such as he inquired about are now available. One paper that Dr. Vincent has probably not seen, as it has not been published as yet, was presented by Friedenwald of Baltimore last spring, and in the latest issue of the Journal of Ophthalmology that is discussed pretty well. I pointed out, however, that it is essentially a disease of the retina and that hemorrhage occurs at the cicatricial phase.

## THE TREATMENT OF CANCER OF THE CERVIX UTERI*

JOHN F. HYNES, M. D.,
Wilmington, Del.

Cancer of the cervix is an important anatomic form of cancer for many reasons. Second only to breast cancer, it is the commonest cancer of women; before the menopause it is more frequent than breast can-

*From The Memorial Hospital.

cer. Many young women who still have children to raise develop cervix cancer: 10% of our patients were under the age of 30 years, 30% under the age of 40 years. In the early stages, most cervix cancers are curable. Finally, diagnosis is easy since the cervix can be seen as well as felt, and biopsy can be obtained without anesthesia or hospitalization of the patient.

Recently the vaginal smear test of Papanicolaou aids us to pick up lesions not grossly evident. This test is not to be depended upon for diagnosis, since sometimes a suspicious smear is not confirmed by biopsy and at other times an obviously cancerous lesion yields a negative smear. The Papanicoloau smear test should be confined to such patients as have no gross lesions. When a gross lesion is present, biopsy is infinitely preferable, and a negative smear test is no proof that cancer is not present.

In recent years we have treated several patients before the onset of symptoms, and a few in whom no gross lesion was visible, but the biopsy showed a very early cancer. In several such cases the Papanicoloau smear was of value in persuading us to take a biopsy from an apparently normal cervix. As the expected result of treating earlier, limited, curable lesions, there has been a steady improvement in the cure rate of cervix cancer over the last few years as will be shown below.

### Source of Material

This paper is based upon a consecutive series of 355 cases, all treated personally by the author from 1935 to 1949 inclusive. During this period 130 other cases were seen, but have been excluded from this analysis for the reasons tabulated in Table 1. All cases, except a few, were treated in the Carpenter Memorial Clinic of the Memorial Hospital. It does not seem pertinent to include in this report patients who were treated elsewhere prior to their admission to the Carpenter Clinic, patients who refused the treatment offered, and patients who died of known cause other than cancer before the results of treatment could be determined. Among this latter group, the prognosis for cure of the cancer presumably was the same as that of the whole series; they can hardly be considered as successes or failures of treatment. The data tabulated in Table 1 is included in this report so that any reader wishing to recalculate the results by a different method of selection can do so.

**TABLE 1**

**Cervix Cancer Cases Excluded from this Analysis**

| | 35-39 | 40-44 | 45-49 | Total |
|---|---|---|---|---|
| (1) Healed servix cancer referred for follow up examination only. | 3 | 6 | 5 | 14 |
| (2) Healed cervix cancer referred for care of radiation necrosis. | | | 3 | 3 |
| (3) Healed cervix cancer referred for treatment of metastatic lesions. | 2 | 2 | 5 | 9 |
| (4) Cancer of the cervix untreated (did not return or went elsewhere). | 20 | 13 | 13 | 46 |
| (5) Cancer of the cervix recurrent after prior treatment elsewhere. | 16 | 17 | 4 | 37 |
| (6) Cancer of the cervix, apparently cured, dying of other proven disease. (All deaths from unknown cause were assumed to be cancer deaths.) | 1 | 7 | 12 | 20 |
| (7) Cancer of the cervix, lost while apparently well, before 5 year observation. (Lost cases of uncertain cure are presumed to be dead of cancer). | 1 | 0 | 0 | 1 |
| | 43 | 45 | 46 | 130 |

Included in this series are both private and service cases. The proportion of negro patients during the first 5 years was 25%, indicating a higher proportion of service than of private patients. Later it dropped to 15%, which corresponds to the relative proportion of negro patients in Delaware. (In Delaware 13% of the population is said to be negro.) The cure rate was the same for negro and white patients in this earlier series; hence, we presume that all patients received treatment of the same quality. No primary case able to report for roentgen therapy as an outpatient was refused treatment or excluded from this series.

Various complicating diseases were encountered among these cervix cancer patients including pulmonary tuberculosis, diabetes mellitus, hypertensive cardiovascular disease, and coronary thrombosis, and cancer of other organs, particularly of the breast, none of which seemed to have any significant relationship to the incidence of cervix cancer except that syphilis was found more often than could be expected in an ordinary series. A positive serologic test for syphilis was obtained in 17% of white patients during the first 10 years of this series, which is much higher than the rate of 2% reported by the Delaware State Board of Health for white

females. We believe that syphilis is probably a predisposing cause of squamous cancer of the cervix.

Cancer of the cervix may develop during pregnancy, as in two of our patients, one of whom now survives over 10 years. At least 6 other patients probably had cancer at the time of delivery and delivered through a cancerous cervix, as judged from the history, but were not seen until weeks or months later. All had advanced cancer on admission, 3 with disseminated metastasis, and none survived. A recent case was found to have cervix cancer upon examination of the curettings for incomplete abortion.

### PROGNOSIS

The most important single factor affecting the prognosis of cervix cancer is the anatomic extent of the disease when the diagnosis is made. All authors who subdivide their cases by stages demonstrate this fact. The duration of symptoms is also significant, since even the apparently small cancer may metastasize or extend widely within the endocervix, where its presence cannot always be recognized, and the longer it has been present, the greater becomes the possibility of metastasis. Delivery through a cancerous cervix, as noted above, is likely to disseminate the disease. Syphilis, though a possible etiologic factor, had no effect on curability in our experience. Cancer arising in the cervical stump after hysterectomy presents some difficulty in treatment, but in this series did not significantly affect survival. Cancer of the cervical stump is relatively common. For example, in the year 1948 20% of our cervix cancer patients had had prior supracervical hysterectomy.

We could find no correlation between the pathologic grade of malignancy and either radiosensitivity or long term survival that could not be explained equally well by the anatomic extent of disease. We agree with Corscadden[1] that bulky, extensive cancer seems biologically different in its response to radiation therapy; as though it were more aggressive and more able to withstand treatment. The same observation has been made with respect to oral and pharyngeal cancer by ourselves and others.

All the cases in this series were treated by combined roentgen and radium therapy with the following exceptions: two patients with early cancer of the prolapsed uterus had vaginal hysterectomy, preceded in one case by x-ray therapy directly to the extruded cervix. One patient with early cancer and extensive pelvic inflammatory disease and tubo-ovarian abscess had a total abdominal hysterectomy. One patient with carcinoma in situ (the only case in this series) had a Sturmdorf amputation of the cervix. These surgically treated patients have all survived more than 5 years. Many patients had x-ray therapy only because slough and infection were so extensive that safe application of radium was impossible. None of these survive. A few cases had radium therapy only because of age, debilitating disease, extreme obesity and the like. Almost all patients had heavy external irradiation and vigorous radium therapy as described below.

### PLAN OF TREATMENT

Once the diagnosis had been proven by biopsy, almost all patients were given x-ray therapy through two anterior and two posterior pelvic portals, giving 200 r through each of two 16 x 8 cm. semi-circular ports daily for an average of 2400 r through each of four ports in four to five weeks. (The dosage range was 2000 to 3000 r.) Variation in dosage was based chiefly on the difference in thickness of the abdominal wall of the patient and of the sagittal diameter of the pelvis. In most cases the dose delivered to the parametrial tissues was approximately 2500 rT. Radium was inserted into the cervix immediately upon completion of the roentgen therapy for a dose of approximately 4500 mg. hours. This dose was varied according to the number of points of application available. The figure reported is an average. The technique of treatment is fully described in a previous publication.[2] Preliminary x-ray therapy is advantageous since it reduces the bulk of the cancer, decreases vascularity, (bleeding usually stops in a week or two), and clears up infection, making radium insertion easier, safer, and more accurate. In our experience a contraction of the vaginal apex never results until many weeks after radium therapy. Many post-menopausal patients present themselves with a relatively contracted or rigid vaginal apex prior to any

treatment. Such post-menopausal contraction is not enhanced by x-ray therapy.

### END RESULTS

The result of treatment up to five years is known in all cases except one who moved away after three years and could not be traced. Several other patients have been lost since the five year period and are presumed to be well unless proven otherwise. Practically all patients have been examined periodically; very few have been followed by mail, by telephone inquiry or through the referring physician. During the first period of this study (1935-1939), of 98 patients treated, 50 were living and well 5 years after treatment, or 51%. For the second period (1940-1944), of 110 patients treated, 60 survived in good health for 5 years, or 55%. In the third period (1945-1949), 55% of the patients treated more than 5 years ago (up to 1947) remained well, and many of the others survive without symptoms.

From our past experience with recurrent or residual cancer, it is anticipated that the final survival rate in this third period will be close to 60% five year survival. Most deaths from cervix cancer occur within the first two or three years. In general, the five year survival rate is 10% to 15% less than the three year survival rate. (Meigs[3] & Hynes[2]). Recurrent cancer after 5 year survival has been quite rare in this series. To date it is less than 5% of our cases.

### COMPLICATIONS OF RADIATION THERAPY

In any large series of cases, apart from the manifestations of recurrent cancer, certain complications may occur. Provided serious complications are not too frequent, one is justified in following a plan of vigorous irradiation of so lethal a disease. Frequently patients have a moderate colitis or proctitis, with or without blood in the stools. This usually subsides, but occasionally culminates in a surgical lesion of the bowel; that is, stricture or perforation. Among the 355 cases reported, there were 9 surgical lesions produced which required either temporary colostomy or resection of the bowel for relief. Many other patients had moderate to severe colitis which subsided under medical therapy without surgical treatment. Five deaths are directly attributable to irradiation, either from bowel injury or as the result of pelvic abscess following upon the exacerbation of chronic pelvic inflammatory disease. Several of the bowel complications in this series were reported by Spackman.[4]

Injury to the bladder from proper irradiation of cervix cancer is relatively rare. In this series, 4 vesico-vaginal fistulae are thought to have resulted from treatment. At least 14 other patients developed fistulae between bladder and vagina or between bowel and vagina as the result of proven uncontrolled cancer. It is well known that the natural history of untreated cancer of the cervix is the development of fistulae between vagina and neighboring organs.

Ureteral obstruction from radiation fibrosis was suspected on several occasions but always proved to be due to recurrent cancer obstructing the ureter. In this connection it should be noted that pelvic inflammatory disease occurring after heavy radiation therapy may produce a frozen pelvis indistinguishable from advanced cancerous infiltration, except that palliative measures, such as colostomy, pelvic diathermy and the like, gave complete symptomatic relief, and long term survival disproved the clinical impression of recurrent cancer. Stricture of the recto-sigmoid may occur in this inflammatory reaction to treatment. We have not yet found a case of benign ureteral stricture.

Fracture of the femur has been reported as a late result of radiation osteitis; we have never had this occur, probably because the femur is not irradiated by the technic we employ. Pelvic infection, including pyometra, parametritis, and tubo-ovarian abscess (particularly the flare up of a pre-existing salpingitis), may occur following radiation therapy. In our first series there were two deaths from pyometra which was treated by hysterectomy. Since then we have learned that conservative measures: such as, repeated dilatation, intrauterine irrigation, diathermy, and now the anti-bioties, will control such infections, except when uncontrolled cancer persists. A useful agent in the treatment of post-radiation slough and necrosis is activated zinc peroxide which releases nascent oygen for twenty-four hour period after its application as a paste or a

powder, and helps to control the anerobic organisms usually present.

SURGICAL TREATMENT

To date, no published series of surgically treated patients can compare with the results obtainable by good radiation therapy. Practically all surgical reports are confined to carefully selected cases: the stage I or stage II cases that also respond very well to radiation therapy. Total abdominal hysterectomy must of necessity remove the cervix and the immediately adjacent tissues with only a narrow margin because of the proximity of bladder, ureters, rectum, and their supporting fascia, blood vessels, and nerves. For the cancer limited strictly to the cervix, either hysterectomy or radiation therapy will be effective. Once the cancer has invaded the parametrial and paracervical tissues, radiation therapy offers more adequate treatment than hysterectomy, and who can tell when such invasion has begun? Arneson[5] has demonstrated that certain cases with pelvic node metastasis are controllable by x-ray therapy, though some proponents of surgical therapy argue that only surgical treatment can cure the patient if lymph node metastasis has occurred. (In practice, few surgical cures are reported when the dissected lymph nodes are positive for metastatic cancer.)

However, we believe that there is a definite place for surgical treatment of cervix cancer; namely, the cancer which has proved itself to be resistant to irradiation treatment, or the advanced cancer which is considered not amenable to radiation therapy. Some cases in these categories we think may be curable by truly radical surgery. Total hysterectomy, as noted above, is not truly radical since so many potentially invaded tissues are preserved in the course of the operation. By radical removal of cervix cancer, we mean pelvic exenteration; that is, en bloc removal of bladder, urethra, uterus, adnexa, vagina, and rectum, with all surrounding tissues down to the endopelvic fascia, including of course the pelvic lymph nodes from the aortic bifurcation downward. The ureters may be implanted into the sigmoid colon above the colostomy left by proctectomy, or into the isolated cecum, if a cecal blader is devised, or brought out to the skin as a cutaneous ureterostomy.

So formidable an operation is justified only in desperate cases where there is no other prospect of cure or palliation. At present we are not prepared to recommend it as other than a surgical experiment, until sufficient evidence accumulates. An occasional patient has been so treated in the past four years, but no long follow-up is available. On the present evidence we think the operation has a place in the therapy of *recurrent* cervix cancer if the necessary hospital facilities and surgical skill is available. Since recurrent cervix cancer is never controllable by additional radiation therapy, radical surgical treatment is indicated in such cases.

It is too early to report the results of such radical surgery since we have had no experience with it prior to 1948. Suffice it to say that several of my associates have attempted radical cure of recurrent cervix cancer in approximately 25 cases. (The exact number is obscured by the fact that similar radical operations were performed for some other varieties of cancer.) The operative mortality has not been excessive in our opinion (less than 25%) and there are 7 survivors of pelvic exenteration who remain in moderately good health from six months to three and one-half years since operation. Obviously any definitive analysis of pelvic exenteration must await a much longer period of observation. At present it cannot be recommended for the routine treatment of cervix cancer, even though advanced or recurrent.

In general, we believe that adequate, careful, thorough, combined radiation therapy is the treatment of choice for cancer of the cervix. No doubt total hysterectomy will cure the limited cancer, if one can select that case. Irradiation will cure not only the limited cancer, but also many moderate to extensive cancers. When cancer recurs (or rather remains) after irradiation or hysterectomy, truly radical surgery may offer a chance of cure: that is, pelvic exenteration. It is our personal conviction that "radical hysterectomy," "Wertheim hysterectomy," or "hysterectomy with iliac node dissection" offers little more than total hysterectomy. If the cervix cancer is limited to the cervix, total hysterectomy will cure it; if it involves the

parametrium, irradiation or pelvic exenteration may cure it.

SUMMARY

(1) Cancer of the cervix is curable in its early stages. It frequently affects young women with family responsibilities. The diagnosis is easy because the cervix is accessible to palpation and inspection and biopsy can be done in the office without anesthesia, sometimes even before symptoms appear. Papanicolaou smear tests occasionally reveal the necessity for biopsy of the apparently innocent cervix. Such tests should not be relied upon if a grossly visible lesion is present and available for biopsy.

(2) A consecutive series of cases personally treated from 1935 to 1949 is reported from the Memorial Hospital of Wilmington, Delaware. The selection of cases for the report is described and tabulated. Ward and service cases are included.

(3) The importance of early diagnosis and treatment of cervix cancer is discussed.

(4) Syphilis is considered to be a possible etiologic factor in the development of cervix cancer.

(5) The technic of combined roentgen and radium therapy is described and the results from such treatment reported.

(6) The complications of radiation therapy and their management are discussed.

(7) The role of radical surgical treatment is mentioned and our definition of truly radical surgery and the indications therefor are presented.

(8) The author concludes that combined x-ray and radium therapy is the best treatment for most cases of cancer of the cervix uteri. If the cancer is known to be limited to the uterine cervix, total hysterectomy will cure it. If its exact extent is unknown, radiation therapy offers more than surgical treatment. If the cancer of the cervix is resistant to radiation therapy (as some of them are) pelvic evisceration offers a chance of cure. Total hysterectomy seems to offer as much as the semi-radical operations proposed for the treatment of cervical cancer.

*1100 N. Jackson Street*

REFERENCES

1. Corscadden, J. A.: Gynecologic Cancer, New York: Thomas Nelson & Sons, 1951.
2. Hynes, J. F.: Cancer of the Cervix Uteri, Amer. J. Roent. & Rad. Ther., 60: 368-381, 1948.
3. Meigs, J. V.: Carcinoma of the Cervix Uteri, New Eng. J. Med. 230: 577-582, 607-613, 1944.
4. Spackman, J. G.: Obstructive Lesions of Ileum and Colon Due to Radiation Therapy, Am. Surg. 127: 121-127, 1948.
5. Arneson, A. N.: Radiation and Surgical Trends in the Treatment of Cancer of the Cervix Uteri, Am. J. Roent. & Rad. Ther. 59: 251-259, 1948.

## CONTROL OF EDEMA WITH ELECTROLYTE THERAPY IN TWO CASES OF NEPHROSIS*

RICHARD A. NEUBAUER, M. D.,**
Wilmington, Del.

For many years the management of the nephrotic syndrome has presented a serious medical problem. Regimes of various descriptions have been tried with little lasting success and these have been difficult to evaluate because of spontaneous diuresis which characterizes this condition.[1, 2, 3, 4, 5] Different authors have described therapeutic goals which should be achieved in handling these patients and all agree that cure of the basic disease process would be ideal.[6] One of the most limiting features of the disease, however, is the massive edema which occurs and often is incapacitating. Should relief of this edema with a regime which tended to inhibit its recurrence be feasible in a good number of cases it should be worthwhile since the patient whether child or adult, could then for all practical purposes lead a normal life.

It is the purpose of this paper to report two cases of the nephrotic syndrome treated with the lactate and acetate salts of sodium and potassium along with calcium lactate in amphojel. The cases comprise one adult and one child both of whom were rehabilitated.

This work was begun in order to further evaluate the extracellular and cellular electrolyte abnormalities in chronic renal disease. Recent tissues analyses in the nephrotic syndrome[7] and in advanced renal disease[8] have shown a probable cell deficit of potassium with an increase in cell chloride with a slight increase in total water and sodium. Since lactate is a precursor to bicarbonate and since it is known that excess chloride and bicarbonate presented simultaneously at the distal tubules of the dog kidney will facilitate chloride excretion, lactate was used with sodium.[9] Acetate and lactate were used because of their effect on renal enzyme transport sys-

*This work was supported by a grant from the United States Public Health Service.
**Director of Renal and Electrolyte Research, Memorial Hospital.

tems.[10, 11] Amphojel was chosen for its action on phosphates[12] and calcium was deemed necessary to protect against alkalosis, as sudden changes in the $CO_2$ frequently occurred.

## METHODS

Both cases studied were believed to be examples of severe glomerulonephritis. Since the nephrotic syndrome is often characterized by remissions certain criteria were established to determine the effect of the therapy. Baseline data besides establishing the diagnosis included several days to several weeks electrolyte excretion data for sodium, potassium, and chloride. Should the urine sodium be hypotonic continuously and change only with the administration of sodium and should the occurrence of an iso-osmotic urine occur on this regime with clearance of edema, it was felt that the electrolyte therapy was responsible. This was validated in the following studies of spontaneous diuresis which showed similar changes with no therapy. Thus both cases showed little sodium excretion initially and with near equi-osmotic sodium levels in the urine cleared edema. Since only reasonably accurate balance data was obtainable the chemical description about serum and urine determination of electrolytes correlated with weight changes and administered salts will be presented.[13] Chloride was determined by the method of Schales and Schales.[14]

**Case 1.** T. G. This 3½ year old white male was admitted to the hospital with a chief complaint of generalized swelling. There was no history of antecedent infection, but intermittently three months before admission the patient had puffiness of eyelids and face. Two weeks before admission anasarca was noted and a local physician found 4 + albumin uria. The child was admitted to the hospital for diagnosis and treatment. Physical examination revealed a blood pressure 170/70, pulse 110, respirations 24. There was marked edema of the eyelids and puffiness of the face with ascites and peripheral edema. Cervical nodes were palpable in the neck. Harsh rhonci were heard at the right base. The liver and spleen were palpable and there was bilateral edema of the lower extremities. The impression upon admission was the nephrotic syndrome of sub-acute glomerulonephritis.

Laboratory work throughout the hospital stay revealed a marked hypochromic anemia, urines with a maximum concentration of 1.028 with a 4 + albumin, 4-15 red cells and an occasional white cell. Total proteins were 4.97 with a 1:1 albumin globulin ratio. Maximum cholesterols were 413 mgm%. Initial serum sodium was 128 mEq/L with a potassium of 4.7 mEq/L. Serum chlorides were 105 mEq/L. The patient was treated with salt-free dextro-maltose and bed rest and began a spontaneous diuresis. After five days the spontaneous diuresis stopped and the patient was begun on 15 mEq of potassium daily. This was increased to 30 mEq within the next two days. At the peak of the spontaneous diuresis the patient's sodium concentration in the urine reached 176 mEq/L but with a low serum sodium the diuresis soon lessened with decreasing urine sodium to 38 mEq/L. Upon potassium therapy alone the patient's serum sodium gradually reached normal, but the serum potassium level fell below 4 mEq/L. The patient was then increased to 40 mEq potassium acetate daily and although no marked drop in weight occurred a fluid shift was evident with a complete disappearance of edema. The patient was then maintained on potassium therapy for the next several months, but this appeared to be unsatisfactory in the complete control of edema since puffiness of the face and especially of the abdomen was noted intermittently more frequently accompanied by infections. On potassium and calcium therapy the patient's sodium excretion of urine rose above 200 mEq, and four months after the initial admission the patient was put on one molar sodium lactate and gradually worked up to 200 mEq daily. Slight edema of the face was noted during this time, but this gradually receded and for the last nine months the patient has been well maintained on 200 mEq of sodium lactate and 125 mEq of potassium acetate daily along with 4 grams calcium lactate. During this time the patient has been edema free and has been leading a normal life. Within three months after the initiation of sodium therapy the patient's urine became negative for albumin. There-

after because of a behavior problem the patient stopped taking his medication and gradually accumulated edema and the proteinuria returned. With rehospitalization the patient again took his medication; the edema disappeared and the patient is now completely rehabilitated at home, the urine now being albumin free.

**Case 2.** S. T. This 31 year old white male had been hospitalized in various naval and Veterans Administration hospitals for a 22 month period with a diagnosis of the nephrotic syndrome on the basis of chronic glomerulonephritis. The patient had fluid retention nearly all of the time with massive edema except for several diureses which occurred with intravenous albumin therapy. The fluid, however, returned promptly and the patient remained incapacitated. Frequent infections also complicated the picture. Baseline data was begun 11-10-51. The patient was excreting a hypotonic urine clearing about 30 mEq of sodium daily. He was then begun on what was thought to be one molar sodium lactate with increasing doses up to 160 mEq per day with 20 mEq one molar potassium acetate and 8 grams of Calcium lactate in amphojel (10% solution) daily. Initially the urine concentration of sodium came up to 100 mEq/L, but within a matter of days dropped back to 40-50 mEq/L. During this time the patient lost several pounds but fluid retention again occurred and the patient gained about 10 pounds of weight on therapy. The medication was discontinued and it was later found that the sodium lactate was other than one molar. The patient in the meantime received several transfusions and on continuous potassium therapy and bed rest lost all of his edema except about 8 lbs. He was then discharged on 100 mEq potassium acetate, much improved clinically. He was followed at weekly intervals and in April, 1952 was begun on increased doses of one molar sodium lactate until a maximum dose of 200 mEq was obtained. This time the patient responded very favorably and the urine concentration of sodium has gradually come up to an equi-osmotic with a disappearance of all edema except very slight intermittent puffiness of the left eye. The patient is now and has been for the past several months on unlimited activity.

## Discussion

In 1948 Fox published a detailed description of serum and urine electrolyte changes in nephrosis treated with the combined salts of sodium and potassium acetate.[15] He was able to show that in the edematous phase of the disease there was a lowered serum sodium and that the urine was hypotonic for sodium. He suspected then a cell deficit of potassium and later further clarified it with his tissue analyses.[7] Marked negative chloride outputs were suspected in his series and these often preceded a diuresis and clinical improvement. Potassium uptakes were common. The rationale for his therapy was the lowered extracellular osmotic pressure as reflected by the low serum sodium and the cell cation deficit as indicated by the positive potassium uptakes. Precursors to bicarbonates were chosen because of the work of Pitts who demonstrated that excess chloride and bicarbonate in the damaged renal tubules of a dog would result in improved chloride excretion.[9] Fox reasoned that if sodium were given the serum level would eventually be raised, although preceded by a drop in this level, and in the hematocrit, indicating a withdrawal of fluid from the cellular compartment. Should the extracellular osmotic pressure be raised the ionic equilibrium could be reestablished and therefore renal function improved.[16] With a larger load of sodium as lactate a closer to an iso-osmotic urine for sodium could be forced and a more psysiological situation reached.[17] He contended that this could not be done without the replacement of the cell cation deficit of potassium as added sodium may well migrate intracellular to replace this loss.[18] With this method he was able to mobilize the fluid in most of his cases, and with the continued administration of the salts, he was able to prevent a recurrence of edema, thus allowing these children to lead essentially normal lives.

In the first case presented an equi-osmotic urine was accompanied by a spontaneous diuresis but when the serum sodium remained at 129 mEq/L the urine sodium also dropped to a low of 13 mEq/L. At this point a fluid

retention phase again occurred, but with the administration of potassium acetate and calcium lactate the urine sodium then rose to a high of 190 mEq/L. As Fox predicted throughout the phases of diureses the urine chloride values were high, at times reaching 200 mEq/L. In the follow-up during the past year, particularly before sodium was administered intercurrent infections produced slight puffiness of the face. This was correlated with a diminution of urine sodium excretion and decreased urinary output. When the patient was finally worked up to full doses of sodium lactate intercurrent infections produced much less edema and urine sodium did not change.

In the second case presented it is of note that the patient had edema with a normal serum sodium (ranging from 136-143 mEq/L over the first week). The serum potassium was low normal during this period being below 4 mEq/L and the serum chlorides were 110 mEq/L. Initially before therapy the urine sodiums fell to a low of 11 mEq/L, but the urine output remained adequate being above 2 liters in 24 hours. After the patient gained edema during the first attempt at therapy the serum sodium fell to 129 mEq/L and the serum chlorides fell to 95 mEq/L. Urine chlorides excreted in this case remained low for over a five months period and recently have returned to normal of about 150 mEq in a 24 hour period with an intake of an average of 45 mEq in 24 hours. Recently the urine sodium values have been between 126 and 154 mEq/L. The $CO^2$ at one time reached a peak of 35 mEq/L, but is at present normal, as is the entire structure of the extracellular fluid in regard to described electrolytes.

SUMMARY

Two cases of the nephrotic syndrome, one adult and one child, were treated with the alkaline salts of sodium, potassium and calcium. On the administration of these salts the urine sodium reached an equi-osmotic level and a diuresis was achieved. In the child albuminuria has disappeared. It is felt that this type of therapy may be quite beneficial in the handling of certain patients with the nephrotic syndrome.

REFERENCES

1. Hartman, A. F., Senn, M. J. E., Nelson, M. and Pulley, A.: The Use of Acacia in the Treatment of Edema, JAMA, 100:251, 1933.
2. Strumia, M. M., Blake, A. D., Jr. and Cornman, W. D.: The Diuretic Effect of Globin in Chronic Glomerulonephritis, JAMA, 131:1033, 1946.
3. Chasis, H., Golding, W. and Baldwin, D. S.: Effect of Febrile Plasma, Typhoid Vaccine and Nitrogen Mustard on Renal Manifestations of Glomerulonephritis, Proc. Soc. Exp. Biol. & Med. 71:565, 1949.
4. Rapoport, M., McCrory, Wm., Barbero, G., Barnett, H. L. and Forman, C.: Effect of Corticotrophin (ACTH) on Children with the Nephrotic Syndrome, JAMA, 147:1101, 1951.
5. Luetscher, J. A., Jr., Deming, K. B.: Treatment of Nephrosis with Cortisone, J. Clin. Invest. 29:1576, 1950.
6. Farr, L. E.: Treatment of the Nephrotic Syndrome. Springfield, Ill., Charles C. Thomas, 1951.
7. Fox, C. L., Jr. and Slobody, L. B.: Tissue Changes in the Nephrotic Syndrome: Demonstration of Potassium Depletion, Pediat. 7:186, 1951.
8. Porter, R. R., Neubauer, R. A., Fischer, E., Young, N. F.: Muscle Biopsy in the Study of Electrolyte Changes, with Particular Reference to Chronic Renal Disease, Trans. Am. Clin. & Climatol. Assoc. 62: 1950.
9. Pitts, R. F., Lotspeich, W. D.: Bicarbonate and Renal Regulation of Acid Base Balance, Am. J. Physiol. 147: 138, 1946.
10. Taggart, J.: Stewart McGuire Lecture Symposium, Richmond, Va., Nov. 1950.
11. McDonald, R. K., Shock, W. W., Yiengs, M. J.: Effect of Lactate on Renal Tubular Transfer of Para-amino-hippurate in Man, Proc. Soc. Exp. Med. & Biol. 77:686, 1951.
12. Shorr, E. and Cater, A. C.: Aluminum Gel in the Management of Rental Phosphatic Calculi, JAMA. 144:1549, 1950.
13. Fox, C. L., Jr.: Stable Internal Standard Flame Photometer for Potassium and Sodium Analyses, Anal. Chem. 23:137, 1951.
14. Schales, O. and Schales, S. S.: A Simple and Accurate Method for the Determination of Chloride in Biological Fluids, Journ. Biol. Chem. 140:879, 1941.
15. Fox, C. L., Jr. and McCune, D. J.: Electrolyte Changes in Nephrosis, A. J. Med. Sci. 216:1, 1948.
16. Elkinton, J. R., Winkler, A. W., Danowski, T. S.: The Importance of Volume and of Tonicity of Body Fluids in Salt Depletion Shock, J. Clin. Invest. 26: 1002, 1947.
17. Newbergh, L. H.: Renal Tubular Work, Its Significance for the Clinician, Bull. N. Y. Acad. Med. 24: 137, 1948.
18. Darrow, D. C., Schwartz, R., Iannucci, J. F. and Orville, F.: Relation of Serum Bicarbonate Concentration to Muscle Composition, J. Clin. Invest. 27: 198, 1948.
19. Porter, W. B., Simons, G. E.: The Treatment of Bichloride of Mercury Poisoning, Am. J. Med. Sci. 188:375, 1934.

## MEDICAL SOCIETY OF DELAWARE
### Amendment Adopted
### BY-LAWS

The following Amendment for the booklet of By-Laws of the Medical Society of Delaware was adopted by the House of Delegates on September 8, 1952. Each member should paste this new Amendment in his copy of the By-Laws.

Page 10, New Amendment to Article 3, Section 6—Dues and Assessments. Active members of this Society who retire from practice before the age of seventy and who derive no part of their income from the practice of medicine shall be excused from the payment of annual dues or special assessments of this Society, provided they are similarly excused from the payment of dues and assessments of their component county society.

In order that our retired members may receive the benefits of this new Amendment the three County Societies should promptly adopt a similar Amendment and file a copy of same with the Executive Secretary.

# + Editorials +

**DELAWARE STATE MEDICAL JOURNAL**

*Owned and published by the Medical Society of Delaware, a scientific society, non-profit corporation. Issued about the twentieth of each month under the supervision of the Committee on Publication.*

W. Edwin Bird, M. D. ..... Editor
822 North American Building

Andrew M Gehret, M.D. ..... Associate Editor
1007 Park Place

M. A. Tarumianz, M. D. .....Assoc. & Managing Editor
Farnhurst, Del.

Articles are accepted for publication on condition that they are contributed solely to this Journal. Manuscripts must be typewritten, double spaced, with wide margins, and the original copy submitted. Photographs and drawing for illustrations must be carefully marked and show clearly what is intended.

Footnotes and bibliographies should conform to the style of the Quarterly Cumulative Index Medicus, published by the American Medical Association, Chicago.

Changes in manuscript after an article has been set in type will be charged to the author. The Journal, pays only part of the cost of tables and illustrations. Unused manuscripts will not be returned unless return postage is forwarded. Reprints may be obtained at cost, provided request is made of the printers before publication.

The right is reserved to reject material submitted for publication. The Journal is not responsible for views expressed in any article signed by the author.

All advertisements are received subject to the approval of the Council on Pharmacy and Chemistry of the A. M. A. Advertising forms close the 25th of the preceding month.

Matter appearing in The Journal is covered by copyright. As a rule, no objection will be made to its reproduction in reputable medical journals, if proper credit is given.

Subscription price: $4.00 per annum, in advance. Single copies, 50 cents. Foreign countries: $5.00 per annum.

Vol. 24 October, 1952 No. 10

## New Publication Date

Ever since the New Series of *The Journal* began in 1929 the publication date has been the twenty-fifth of the current month. Now, at the request of the State Journal Advertising Bureau, The American Medical Association's department that procures national advertising for the state journals, it will be advanced to the fifteenth of the current month. This will make the Delaware *Journal* conform more closely to the schedule already in use by most of the state journals, will make the national program of the various advertisers more uniform, and will obviate the receipt of *The Journal* after the current month, which has happened occasionally, due to unpreventable delays.

Accordingly, all material intended for publication in a given issue must be in the hands of the Editor on or before the tenth of the previous month, instead of the twentieth. We hope our confreres and friends will bear this in mind and help us make this transition as promptly and as painlessly as possible. Our thanks in advance.

## Did You Know?

A majority of the active, private physicians in the United States belong to the Republican party. Republican doctors, in fact, outnumber Democratic doctors by almost 2.5 to 1.

This is revealed in the current (October) issue of *Medical Economics*, national business magazine for physicians. The magazine is publishing the results of a nationwide survey of medical practice, based on a questionnaire sent to each of its 134,000 M.D. readers.

About 54 per cent of the doctors surveyed said they were Republicans; 22 per cent said they were Democrats; the remaining 24 per cent classified themselves as independents. Less than 1 per cent specified affiliation with minor parties.

Republican physicians, *Medical Economics* says, are apparently most prevalent in the Central and Northwest sections, where they outnumber Democrats by more than 6 to 1. Even in the so-called "solid" Southeast, only half call themselves Democrats. A listing of doctors' polities by region follows:

| | Republicans | Democrats | Independents |
|---|---|---|---|
| New England | 53% | 11% | 36% |
| Middle East | 49 | 23 | 28 |
| Southeast | 21 | 50 | 28 |
| Southwest | 34 | 34 | 31 |
| Central | 68 | 11 | 22 |
| Northwest | 73 | 12 | 14 |
| Far West | 71 | 15 | 14 |
| All U. S. | 54 | 22 | 24 |

(Sets of figures do not always equal 100 per cent because of rounding.)

According to the survey, Republican tendencies are strongest among eye, ear, nose, and throat specialists (6.2 Republicans per Democrat), least strong among dermatologists and among psychiatrists and neuro-psychiatrists (1.5 Republicans per Democrat). Half the psychiatrists, incidentally, consider themselves independent politically.

Doctors' political views vary considerably according to income, the magazine has discovered. Among physicians who net in the neighborhood of $5,000 a year, there are two Republicans for every Democrat. Among those netting around $30,000 a year, there are four Republicans per Democrat.

In towns of under 5,000, Republican medical men outnumber Democrats 2.8 to 1. They hold only a 1.3-to-1 edge in cities of over a million.

## DELAWARE ACADEMY OF MEDICINE

The Library of the Delaware Academy of Medicine serves the medical and dental professions in the following ways:

INFORMATION SERVICE. This service is usually by telephone, such as an address of a doctor, medical school, or checking on reference in an index, etc.

REFERENCE SERVICE. This service includes selecting from the Library collections the material needed for information on some subject, or for the preparation of a paper, or for the reporting of an interesting case. For this service it is not necessary to furnish the Library with any references, only to indicate the subject.

BIBLIOGRAPHIC SERVICE. This service includes the compilation of bibliographies for any phase of a subject or for any period of years. Bibliographies of some interesting or rare subjects are kept on file and are brought up to date from time to time as the need arises.

SPECIAL INTEREST SERVICE. Upon request of a member all current periodicals as they are received are checked for articles in whatever field he may be interested, and is notified when an article on given subject is published.

The above services given in this Library are worthy of mention, since this is a field omitted in many of the larger libraries, the readers being required to gather all their own references.

It should be also noted that material is being sent free of charge to all members residing outside New Castle County.

All material not included in the Library collections can be obtained through interlibrary loan from other libraries. Such material can be secured either in original or photostatic copy, depending on the member's preference. Such material, where the cost of the photostatic copy is less than $1.50, or is material published in the current year, can not be secured in the original form. All photostatic copies become the property of the respective members.

The Library is opened to all physicians, dentists, residents, and interns, but only members of the Academy are allowed to take material out of the Library.

Library hours: Daily 10 a.m. to 5 p.m.; closed Saturdays and Sundays. Open on evenings of meetings; consult the librarian for exact evening hours. Telephone 2-2413.

## DELAWARE ACADEMY OF GENERAL PRACTICE

All physicians are invited to attend the First Annual Scientific Session, Saturday, December 6, 1952, at the Delaware Academy of Medicine, Lovering Avenue at Union Street, Wilmington. There is no registration fee.

PROGRAM

9:00 a.m. General Assembly for the Transaction of Delaware Academy Business.

10:30 a.m. O. Spurgeon English, M. D., Professor of Psychiatry, Temple University—"The Relation of Good Parental Care to the Prevention of Psychosomatic Illness."

12:00 Noon—Luncheon. Subscription $1.50.

1:30 p.m. Louis Krause, M. D., Professor of Medicine, University of Maryland—"Medicine and the Bible."

2:45 p.m. Julius Pomeranze, M. D., Clinical Assistant in Medicine, New York Medical College — "Diagnosis and Treatment of Atherosclerosis."

4:00 p.m. Philip Thorek, M. D., Clinical Assistant Professor of Surgery, University of Illinois, College of Medicine—"The Acute Abdomen."

5:15 p.m. Film, "Tele-Clinic of the 1952 Scientific Session of the A. A. G. P." Courtesy of WYETH, INCORPORATED.

7:00 p.m. Cocktails and Annual Banquet, Kent Manor Inn. Subscription $15.00 per couple.

Guest Speaker—R. B. Robins, M. D., President of the A. A. G. P.

Installation of Officers for 1953.

Special program planned for your ladies.

---

There were 92 per cent more fatal accidents on icy roads last year than in 1950.

---

Three out of four motor vehicles involved in 1951 accidents were passenger cars.

## OBITUARY

Aubray C. Smoot, M. D.

Dr. Aubray C. Smoot, of Georgetown, died suddenly on August 16, 1952, following a heart attack.

Dr. Smoot, a practicing physician in Georgetown since 1930, was the son of the late Rev. Truston C. Smoot and Fannie Griffith Smoot. He was born in Felton in 1898 while his father was serving as pastor of the Methodist Church there.

After graduating from Western Maryland College where he received his bachelor's degree, Dr. Smoot taught in the prep school there for several years. He majored in pharmacy in the Philadelphia College of Pharmacy, then entered the University of Maryland Medical School, graduating with an M.D. degree in 1928.

For two years before coming to Georgetown, he was associated with Dr. Julius Friendenwald, a Baltimore stomach specialist. A member of Nanticoke Lodge 172, F&M of Federalsburg, Md., and of Hope Chapter 7, Royal Arch Masons, of Georgetown, Dr. Smoot was an active member of Wesley Methodist Church in Georgetown and was a member of Sussex Post 8, American Legion.

A World War I veteran, Dr. Smoot was president of the Georgetown Special School District for three years and was physician of the Sussex County Prison since 1934. One of the oldest members of the Indian River Yacht Club, Dr. Smoot was commodore for the club for the 1949-50 year. He was a former member of the Georgetown Kiwanis Club.

He is survived by his wife, the former Eleanor Virginia Norris; two sons, Dr. Aubray C. Smoot, Jr., an intern in the Delaware Hospital in Wilmington, and Lt. (jg) William Norris Smoot, aboard the aircraft carrier USS Princeton in the Pacific; two brothers, Dr. Merrill C. Smoot of Hagerstown, Md., and Ralph Smoot of Fordyce, Ark.

Funeral services were held on August 19, 1952, with burial at Denton, Md.

### How Many Voted Recently?

| | |
|---|---|
| Australia | 96 per cent |
| Belgium | 90 per cent |
| Italy | 89 per cent |
| Great Britain | 82 per cent |
| Sweden | 80 per cent |
| France | 75 per cent |
| Canada | 74 per cent |
| Israel | 72 per cent |
| Japan | 70 per cent |
| United States | 51 per cent |

### Now Will You Vote?

New York, October 2 (INS)—The Greek's had a word for it!

The word was "idiotes," meaning citizens who did not take part in public voting. The English "Idiot" stems from it.

THE ONLY WAY TO HAVE
GOVERNMENT BY THE PEOPLE
Is to Have
VOTING BY THE PEOPLE!

## BOOK REVIEWS

Bacitracin—A Review and Digest of the Literature Up to and Including January, 1952. Cloth. Pp. 127. New York; Research Division, S. B. Penick & Company, 1952.

The purpose of this book is to make available for use by the pharmaceutical industry a review of the data which have accumulated on the clinical usefulness of bacitracin and to direct attention to the wide potential of this drug based upon its known synergistic action with other antibiotics.

The wide publicity and distribution of the generally accepted antibiotics has given little incentive to the physician to investigate the outstanding effectiveness of bacitracin in pyogenic skin infections, open wounds, eye infections, nasal infections, acute and chronic amebiasis, dysentery, and widespread systemic staphylococcic and certain streptococcic and pneumococci infections.

A complete bibliography is given.

Clinical Heart Disease. By Samuel A. Levine, M.D., Clinical Professor of Medicine, Harvard Medical School. 4th edition. Pp. 556, with 192 figures. Cloth. Price $7.75 Philadelphia: W. B. Saunders Company 1951.

Without losing the charm of previous editions, this excellent text has been brought up to date. Anticoagulants, advances in the evaluation and treatment of congenital heart disease, and the role of cardiac surgery are given proper emphasis. Almost two hundred pages are devoted to a complete revision of the discussion of electrocardiography, including unipolar and precordial leads. Finally, a few pages are devoted to phonocardiography.

As important as are the advances in technical knowledge, these are perhaps overshadowed by the personal observations and practical teachings of the author. The chapters on rheumatic fever, angina pectoris and coronary thrombosis, and hypertensive heart disease and arteriosclerosis merit the attention of all physicians.

Since the work is based upon the author's life-long observations, together with those of his many friends who are leaders in the field of cardiology, a bibliography is neither necessary nor desirable.

The publishers are to be commended upon the continued excellence of their art.

---

Principles of Refraction. By Sylvester Judd Beach, M.D., Chief Ophthalmologist, Portland (Maine) City Hospital; Past President, American Ophthalmological Society. Pp. 158. Cloth. Price, $4.00 St. Louis: C. V. Mosby Company, 1952.

Knowing the interest and enthusiasm Dr. Beach has had in refraction it has been a pleasure to read his book. His novel way of presenting his ideas makes the reading fascinating and illuminating. Who else, Dr. Lancaster asks in his introduction, would have thought of illustrating and driving home the problems of image formation of cylindrical lenses and the way astigmatic eyes see things by the homely example of a glass of water for a cylinder and the window bars as test objects?

Refraction as pointed out by Beach is the deflection from its path of a ray of light on passing from a medium like air to one of different density such as glass. Since we are able to fit lenses to remedy the deviation of the optical system of the eye from standard, the name refraction has been made to include the examination of eyes for glasses.

Ocular Neurosis, the final chapter, with case histories and actual treatments, is a valuable contribution toward understanding and treating psychosomatic patients who come with eye complaints.

Dr. Beach has the ability to convey his thoughts to others and in plain and understanding language makes the subject matter clear.

---

Diagnostic Bacteriology. By Isabelle G. Schaub, A.B., and M. Kathleen Foley, M.A. Fourth Edition. Cloth. Pp. 356. Price, $4.50. St. Louis: C. V. Mosby Company, 1952.

This is an up-to-date presentation of practical methods for the isolation and identification of pathogenic bacteria. With the development of antibiotics and antibacterial chemotherapeutic agents, it is imperative for the physician to know what type of organism he is dealing with before the proper drug is selected.

The book discusses Bacteriological Methods and Diagnosis, Determination of the Sensitivity of Bacteria to Antibiotics, Serologic Diagnosis, Media, Stains and Staining Techniques, Reagents and Tests. A complete subject index ends the book.

It may be used in liberal arts colleges and universities as a text in undergraduate courses in medical bacteriology, in the highly specialized courses offered by the various schools training laboratory technicians, and at the graduate level in professional schools.

This book is printed on good paper, with easily read type.

---

Medical Aspects of Civil Defense. Sponsored by the Council on National Emergency Medical Service of the A.M.A. Paper. Pp. 130. Price 25 cents. Chicago; A.M.A., 1952.

These ten articles which have appeared in J.A.M.A., have now been reproduced in booklet form. These articles are of genuine interest to the medical profession and the general public, and we are, therefore, interested in publicizing its availability as widely as possible.

**THE COUNCIL-ACCEPTED USES OF**

# Dramamine®

**NOW ARE:**

| | |
|---|---|
| *SYMPTOMATIC CONTROL OF NAUSEA AND VOMITING ASSOCIATED WITH* | *pregnancy*<br>*therapy with certain drugs (antibiotics, etc.)*<br>*electroshock therapy*<br>*narcotization* |
| *MANAGEMENT OF VERTIGO IN* | *Ménière's syndrome*<br>*radiation sickness*<br>*hypertension*<br>*fenestration procedures*<br>*labyrinthitis* |
| *MANAGEMENT OF VESTIBULAR DYSFUNCTION ASSOCIATED WITH* | *Streptomycin therapy* |

Tablets: 50 mg. each
Liquid: 12.5 mg. in each 4 cc.

*—and, of course, MOTION SICKNESS*

Dramamine®

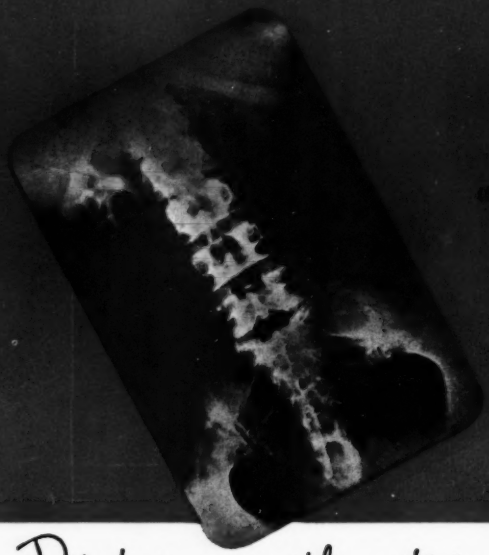
BRAND OF DIMENHYDRINATE

•

**SEARLE**

RESEARCH IN THE SERVICE OF MEDICINE

•



NEO-IOPAX®

(Sodium Iodomethamate U.S.P.)

A safe urographic contrast medium remarkably free from hazard for the patient.

# Pictures without penalties

**NEO-IOPAX *urograms and* PRIODAX *cholecystograms***
**give definitive information for diagnosing certain pathologic conditions of the urinary and biliary tracts, respectively—without penalty.**

PRIODAX

Schering CORPORATION
BLOOMFIELD, N. J.

NEO-IOPAX

PRIODAX

**PARKE**

*Institutional Supplier Of Fine Foods*

•

COFFEE TEAS

SPICES CANNED FOODS

FLAVORING EXTRACTS

•

**L. H. Parke Company**

Philadelphia - Pittsburgh

**JOHN G. MERKEL & SONS**

*Physicians—Hospital—Laboratory—Invalid Supplies*

PHONE 2-2516

1208 King Street

Wilmington, Delaware

**HANCE HARDWARE CO.**

4th and Shipley Sts.

Wilmington, Del.

FRIGIDAIRE APPLIANCES

EASY WASHERS

TOOLS

BUILDERS' HARDWARE

Tel. - Wilm. 5-6565

**ECKERD'S DRUG STORES**

**COMPLETE DRUG SERVICE**

FOR

PHYSICIAN · PATIENT

BIOLOGICALS

PHARMACEUTICALS

HOSPITAL SUPPLIES

SURGICAL BELTS

ELASTIC STOCKINGS

TRUSSES

513 Market Street 723 Market Street

900 Orange Street Manor Park

WILMINGTON, DELAWARE

**Physicians' and Surgeons'**

**Liability Insurance**

**at**

***Low Group Rates***

You may avoid unpleasant situations and heavy expense through New Castle County Medical Society's Group Professional Liability Insurance.

***Rates substantially lower***

*As Administrators of this plan, we offer complete service.*

*Write or Phone*

**J. A. Montgomery, Inc.**

DuPont Bldg. 10th & Orange Sts.

Phone Wilmington 5-6561

*If it's insurable we can insure it*

Customer satisfaction comes first with the baker where a *KNOWN bread is featured. Quality with us is never an accident but the result of good intention and sincere effort.

**Freihofer's**

Bakers of *NATIONALLY-KNOWN

**Hollywood BREAD**

# Sealtest Homogenized Vitamin D Milk

Easier to digest

Better tasting

Carefully checked and tested to safeguard purity and freshness!

You can recommend this fine product with every confidence in its quality and dependability. Easier to digest—curd is broken up and evenly distributed. Easily assimilated—400 USP units of Vitamin D are added to each quart to aid in the utilization of calcium and phosphorus.

And everyone loves its rich, creamy flavor!

**CLOVER DAIRY**

Get the best...get

**Sealtest**

**DAIRY PRODUCTS**

*The Marshall Square Sanitarium West Chester, Pa.*

*A Private Hospital for the Chronically Ill*

## THE MARSHALL SQUARE SANITARIUM

WEST CHESTER, PENNSYLVANIA

Recognized by the American Medical Association, licensed by the State of Pennsylvania, member of the American Hospital Association and of The American Association of Private Psychiatric Hospitals.

EVERETT SPERRY BARR, M. D., *Director*

---

**ACCIDENT • HOSPITAL • SICKNESS**

# INSURANCE

**For Physicians, Surgeons, Dentists Exclusively**

ALL PREMIUMS COME FROM — PHYSICIANS SURGEONS DENTISTS — ALL CLAIMS GO TO

| | |
|---|---|
| **$5,000 accidental death Quarterly $8.00**<br>**$25 weekly indemnity, accident and sickness** | **$15,000 accidental death Quarterly $24.00**<br>**$75 weekly indemnity, accident and sickness** |
| **$10,000 accidental death Quarterly $16.00**<br>**$50 weekly indemnity, accident and sickness** | **$20,000 accidental death Quarterly $32.00**<br>**$100 weekly indemnity, accident and sickness** |

*COST HAS NEVER EXCEEDED AMOUNTS SHOWN*

**ALSO HOSPITAL INSURANCE**

| | Single | Double | Triple | Quadruple |
|---|---|---|---|---|
| 60 days in Hospital | 5.00 per day | 10.00 per day | 15.00 per day | 20.00 per day |
| 30 days of Nurse at Home | 5.00 per day | 10.00 per day | 15.00 per day | 20.00 per day |
| Laboratory Fees in Hospital | 5.00 | 10.00 | 15.00 | 20.00 |
| Operating Room in Hospital | 10.00 | 20.00 | 30.00 | 40.00 |
| Anesthetic in Hospital | 10.00 | 20.00 | 30.00 | 40.00 |
| X-Ray in Hospital | 10.00 | 20.00 | 30.00 | 40.00 |
| Medicines in Hospital | 10.00 | 20.00 | 30.00 | 40.00 |
| Ambulance to or from Hospital | 10.00 | 20.00 | 30.00 | 40.00 |
| **COSTS (Quarterly)** | | | | |
| Adult | 2.50 | 5.00 | 7.50 | 10.00 |
| Child to age 19 | 1.50 | 3.00 | 4.50 | 6.00 |
| Child over age 19 | 2.50 | 5.00 | 7.50 | 10.00 |

$4,000,000.00 INVESTED ASSETS

**PHYSICIANS CASUALTY ASSOCIATION**
**PHYSICIANS HEALTH ASSOCIATION**

$18,900,000.00 PAID FOR CLAIMS

50 years under the same management

**400 First National Bank Building Omaha 2, Nebraska**

$200,000.00 deposited with State of Nebraska for protection of our members

EVERYTHING NEW IN DRUGS

**FOR DOCTORS ONLY!**

**61380**

6-1380 is Brittingham's unlisted telephone number for the use of doctors only. . . . Phone your prescriptions to us and we will deliver them by fast motorcycle to any point in the city or suburbs. . . . No charge, of course!

**BRITTINGHAM'S**

PHARMACY

Medical Arts Bldg. Del. Trust Bldg.

**Baynard Optical Company**

**Prescription Opticians**

*We Specialize in Making Spectacles and Lenses According to Eye Physicians' Prescriptions*

5th and Market Sts.
Wilmington, Delaware

We maintain prompt city-wide delivery service for prescriptions.

**CAPPEAU'S**

*Drug Store of Service*

DELAWARE AVE. at DUPONT ST.
Dial 6-8537

**FRAIM'S DAIRIES**

*Quality Dairy Products Since 1900*

**GOLDEN GUERNSEY MILK**

Wilmington, Delaware Phone 6-8225

*To keep your car running*
**Better–Longer**
*use the dependable friendly Services you find at your neighborhood*

DIAMOND GULF **Service Station**

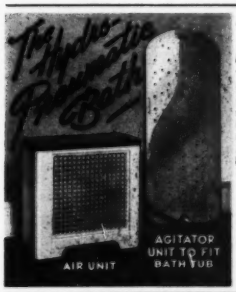
A Store for . . .

*Quality Minded Folk Who are Thrift Conscious*

**LEIBOWITZ'S**
224-226 MARKET STREET
Wilmington, Delaware

**George T. Tobin & Sons**
**BUTCHERS**

**NEW CASTLE, DELAWARE**
**Phone N. C. 3411**

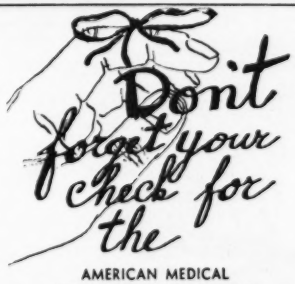



*A NEW METHOD OF AGITATED AERATED UNDERWATER MASSAGE FOR THERAPEUTIC USE*
The patient's reaction to this bath is very pleasing due to its remarkable soothing action.
*Used for Any Portion of the Body*—The Legs, the Arms, the Back, the Full Body.
*Write Today for Descriptive Circular*
THE UNDERWATER MASSAGE APPLIANCE COMPANY
(INC. 1935)
10 S. 18th Street
Philadelphia 3, Pa.
Tel. RI. 6-3481

*Newspaper and Periodical Printing*

An important branch of our business is the printing of all kinds of weekly and monthly papers and magazines

**The Sunday Star**
**Printing Department**
*Established 1881*
Printers of The Delaware State Medical Journal




AMERICAN MEDICAL
EDUCATION FOUNDATION
535 N. Dearborn St., Chicago 10, Ill.

## Enjoy instant, plentiful hot water

For downright convenience, comfort and health of your family — you should have an ample, reliable supply of hot water! With an Automatic Gas Water Heater in your Home, you're sure of all the hot water you want, when you want it. For lightening household tasks, bathing, cleaning, dishwashing, laundering and many other uses. Besides, you save time and worry, for you're sure of constant water temperatures at low cost. Arrange for the installation of an Automatic Gas Water Heater in your home now. Ask your Plumber, or stop in to see us.

With an Automatic Gas
**WATER HEATER**

**DELAWARE POWER & LIGHT CO.**
*"The Public Appreciates Service"*

Borden's
ICE CREAM
IF IT'S BORDEN'S IT'S GOT TO BE GOOD

# Thirst, too, seeks quality

**pause for sure...**
**be refreshed of course**

Coca-Cola
TRADE MARK ®
"Coke"
TRADE MARK ®

*Ask for it either way . . . both trade-marks mean the same thing.*

COPYRIGHT 1952, THE COCA-COLA COMPANY

# LACTUM

*Mead's liquid formula made from whole milk and Dextri-Maltose*

## AS NUTRITIONALLY SOUND...

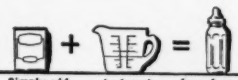
The generous milk protein content of Lactum provides for sturdy growth and sound tissue structure. Dextri-Maltose® supplements the lactose of the milk so that energy needs may be met, fat properly metabolized, and protein spared for its essential functions.

For more than 40 years, milk and Dextri-Maltose formulas with the approximate proportions of Lactum have been used with consistent clinical success. Infants fed Lactum* show good tolerance of feedings, low incidence of digestive disturbances and infections, satisfactory growth response and a generally excellent picture of health and development.

*Frost, L. H., and Jackson, R. L.: J. Pediat., 39:585-592 (Nov.) 1951

## AS IT IS CONVENIENT

Mothers appreciate the ease of Lactum's simple 1:1 dilution. It assures accurate measurement. Lactum is ideal also for supplementary and complementary feedings, and whenever single feedings are indicated.



Simply add 1 part Lactum... to 1 part water... for a formula supplying 20 calories per fluid ounce.

MEAD'S

MEAD JOHNSON & COMPANY
EVANSVILLE 21, IND., U. S. A.